COAL AGE

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SAFER MINERS

PUBLIC OPINION seems to have decided that the burden of the miner's safety should be placed on the shoulders of the operator, and many corporations are following a policy of supererogation by assuming even greater burdens than the law imposes.

Legal statutes may be wisely enacted and enforced with impartial vigor; systems of mining may be evolved by the highest talent and may be supervised by able and conscientious officials—but the miner himself has a burden to bear which neither inspector nor employer can carry for him.

Mines may be thoroughly safe from an engineering standpoint, but the greatest factor of safety or danger in an intelligently operated mine is the individual workman. Statistics show that falls of roof and coal, and accidents connected with the transportation of mine cars, kill and injure nearly twice as many men in coal mines as all other causes combined. Only a very small percentage of these accidents is caused by the failure of the employer to furnish suitable timber or proper transportation facilities. A small percentage is due to the hazard of the calling, but the far greater number of accidents is directly traceable to the failure of the men themselves to exercise care and caution.

The tendency at present seems to be to teach the miner to look upon his employer as a kind of wet-nurse who must ever keep a safety-boss by his side—a policy which decreases his efficiency as a workman and finally debases his manhood by making him unwilling to act well his part. Such a condition also causes the miner to be ever looking for shoulders upon which to unload his own burden.

Damon had joys which Pythias could not share, Jonathan sorrows which David could not bear. Every human being has burdens from which not even Jehovah himself will relieve him. Therefore, let every man who has the welfare and safety of the miner truly at heart consider the fact that the individual is as potent a factor in accident prevention as the company. Furthermore, let each of us endeavor in our dealings and contact with the miner to impress upon him that only by the exercise of constant care and prudence on his own part can he escape the thousand and one so-called accidents which daily—hourly—take their toll of human life and limb.

Side by side with the campaign for safer mines should be waged a campaign for safer miners — a campaign which will impress upon the man with the pick the fact that the price of his safety is his own eternal vigilance. This will cause him to realize the value of individual responsibility and will make him a better miner and a better citizen.

The accident rate in our mines will not reach the desired minimum until the miner is as safe as the mine

Ideas and Suggestions

Automatic Car Rerail

By R. W. Mayer*

A simple, cheap and effective device for rerailing mine cars is made in the following manner: Two full-length rails the same as are used for the mine track are employed. Both ends of these rails are bent into a long curve. The bent part should be from 4 to 6 ft. long, depending on the gage of the track. Each of these bent rails is spiked fast to ties, as close as possible to the track rails, on the inside of the track.

The bent ends of these two rails should touch each other in the middle of the track. They should be laid side by side, one next each track rail. The space between the two guard rails is filled with heavy planking laid flush with the top of the rails. Heavy planking is also spiked fast outside the track rails. It is laid snug against the track rails and should be flush with their tops on the side next to the rail. Its outer edge should be higher, so that it slopes toward the rail.

With heavy loaded cars, planks may not be strong enough and the use of heavier timbers is made necessary. These timbers should be covered with plates of ⅛-in. iron or steel, although it is not absolutely necessary to do so. The slope of the outside planks toward the track rails tends to slide the car-wheels in the direction of the track rails.

The curve on the end of the guard rails catches against the flanges of the derailed wheels and presses them toward the track rails. The straight length of the guard rail holds the derailed wheel on that side, which is now running on its flange, against the track rail. The space between the guard rail and track rail is filled in sufficiently to permit the car-wheel to run on its flange, raising its tread above the rail top.

An 8- or 10-ft. length of plank is spiked fast, parallel to the track rail and outside of it, on top of the other planking. This is placed so close to the rail that the car-wheels will just clear it when they are on the track. This plank should be thicker than the depth of the wheel flanges and tapered off at both ends, so that the wheels can run up on to it easily. It should be covered with ⅛-in. steel plate and should be at least a foot wide. It is placed halfway from the ends of the guard rails, one of them being placed on each side of the track, outside the track rail. The guard rails between the track rails and the steel-plate-covered planking on the outside of the track, sloping toward the rail, draw the car-wheels against the rails.

The car-wheel on the outside of the track then climbs this raised plank, elevating the car-wheel and flange above the rail. The slope of this elevated planking and the pull of the guard rail on the opposite side carry the flange of the wheel over the rail and onto the track. If the plate iron is kept wet or oiled with car grease, the wheels slide easier upon it.

The Northwestern Improvement Co. uses this rerail at its No. 6 mine tipple. This is at the end of a long rope haulage. The cars bumping against each other on coming from the kickback at the tipple, and making up a trip of empties, or the rope starting out with an empty trip, sometimes derails the cars. This device is placed a few feet ahead of where the end of the trip is when starting and never fails to replace the derailed cars on the track.

The cars which are on the rails follow along the track without any interference from the rerailing device. Each side and end of this device is a duplicate of the other, so that it does not matter on which side the car is derailed or which way the trip is traveling.

*Roslyn, Wash.

Making a Mine Map

By George M. Brown*

Though the ordinary mine map will not and need not contain much of the following information when it is to be used only by those well familiar with the mine workings, it is believed that all of this information is essential in case the map is furnished to a distant office, mine inspector, inspection department or others who visit the mine but rarely. These data were gathered with especial reference to maps of mine workings on pitching seams.

The following surface information should be indicated on the map:

Mine buildings, power stations and transmission lines.

Streams and mine reservoir.

Surface contours.

Railroad trackage within the scope of the map.

Locations and elevations of benchmarks used in laying out workings.

Quarter-section lines.

Location and depth of all holes drilled for oil, gas or prospecting purposes.

Surface property lines.

The underground information should include:

Coal dip at the face, also at the beginning of all slopes and planes; likewise at the crop and all places of unusual dip.

Pumps, hoists, telephones, switches, transformers and high-tension transmission lines underground.

Concrete stoppings, water lines, taps and hose.

Fault lines.

Entries numbered, and also every fifth room.

Elevations of transit points.

Proximity of near-by workings should be shown.

Where rooms or other workings have been stopped because of bad roof, deficient coal or other unusual conditions, these facts should be indicated.

Partings should be indicated.

The direction of the ventilating current should be shown, also all doors, overcasts, undercasts and regulators.

*Mining engineer, McAlester, Okla.

Pillars should be measured and drawn to scale, and where they have been pulled it should be noted.

Where any section of the mine has been abandoned this fact should be noted.

The height of coal and the date measured should be shown for all entry, slope and plane faces.

A section through the slope or plane should be given.

Manways should be specially indicated.

The projected workings for one year ahead should be shown in faint lines.

The map should not be drawn with a protractor, but laid out by coördinates.

If any extensions were made from information supplied by the mine foreman or others, this fact should be noted.

A true dip and strike line should be drawn.

A scale of not greater than 100 ft. to the inch should be used, and this scale should be indicated graphically and not by statement.

Whenever a map has been extended, the date should be entered under the legend, together with the signature of the person in charge of the extension.

The yearly production and the acreage opened up should be shown in a table.

Car Off the Track

By Pennsylvania Engineer

"Where are you going?" asked the mine foreman of one of his miners. "Goin' to get a jack from the machine runner—car off the track," replied the man. A little while later the foreman asked one of the motormen why he was so long in making the last trip. The brief answer, "Motor off the track," was enough. During the afternoon word got to the bottom that there was an accident in the mine.

Inquiry directed to the assistant brought out the explanation that a triprider in helping to rerail a loaded car had had his arm broken.

That story is not applicable to any one mine alone, but with certain modifications, to many. Cars or motors are constantly off the track. Light rails, crooked ones, those that are bent and badly laid are each and all the cause of countless derailments. Perhaps a splice plate is missing, or the bolts may be loose or cut out. Then there is the rotten tie left in place until a rail turns over, or a car drops down between the rails because the track loses its gage.

Again it is the frog badly placed or loose, but left in the track until a wreck calls attention to it. It is not uncommon to see a gathering motor bring its trip to the side track and slam eight or ten loads into an equal number standing there, with the result that a car or two jumps the track. Or perhaps the motor has badly cupped wheels that open up the latches after the motor has passed over the switch on its way into the butt entry with empties. You're lucky then if only a single car jumps the track; there might have been half a dozen.

Occasionally one observes a snapper's failure to properly apply the brake while the motor draws a car out of a place. The consequence is that the loaded car hits the curve at excessive speed, jumps off, blocks the neck of the chamber and possibly the entry.

A man cannot advocate safety first and give no thought to cars that get off the track. The danger that may result when a timber has been knocked out is only too well known. Not long ago a mine inspector died as a result of injuries received when a car left the rails and crushed him against the rib. Placing a derailed car back on the track is frequently the cause of accident.

In addition to the possibility of running into danger, think of the enormous and largely unnecessary waste of time following the derailment of a car. Usually when a car jumps the track in a working place, the men there are unable to get it back alone. Perhaps two or three others in neighboring places are called to help. All of those who respond then stop loading coal and devote their time and strength to the unproductive effort required to replace the car. And if it happens that the machine man must be appealed to for the use of his jack, his work may be delayed and the cutting fall behind.

It is still worse, however, when the motor or loaded car jumps the track in the entry. All plans involving the use of gathering motors presume that the motors will be in motion at all times during working hours. If, then, it becomes necessary for the crew of the motor to spend any appreciable portion of each day in replacing either motor or cars, the productiveness of the motor rapidly drops and costs of operation go up.

Moreover, delays of this kind, whether in working places or on the entries, are quickly reflected to a point where they are easily noticed—the mine's production.

It is apparent that where cars are leaving the rails in excessive numbers, there carelessness has produced its usual effect. Either there is carelessness in tracklaying, supervision or inspection.

The Miner's Loss Is the Company's Loss

There is a broad opportunity in our mines in the line of prevention of derailments. The causes that we have just reviewed can be and ought to be largely overcome. If a man has a car off in his place, he ought to be shown why it went off and instructed as to how to prevent a recurrence of the same thing, for his loss of time is the mine's loss.

It's a short-sighted foreman who will pass through such a man's place and then leave him to repeat the same blunder through ignorance and lack of proper instruction. On the other hand, when it is discovered that wrecks are unusually frequent in the entries, it may pay to determine the character of track supplies and investigate the competency of the tracklayers.

The few remedies here suggested will readily be supplemented by others when this subject is considered carefully. A study of the causes and locations of this class of inefficiency, together with a record of the time lost, may possibly bring to light some rather interesting and perhaps surprising information. An investigation of this nature will pay for itself.

Not long ago an operator was told that an average of one empty or loaded car or the motor was getting off the track for each trip that each of his gathering motors made each day. "Oh, no! That can't be the case," he exclaimed. But investigation showed that the statement was true.

How is your record? Have you any reliable data in regard to it? Perhaps your cars are remaining on the track; however, you may find that unnecessary delays, high costs and restricted production can be traced to that largely avoidable cause—car off the track.

Locust Mountain Colliery

By C. M. Young*

SYNOPSIS—A coal basin was discovered by accident. The plans for its development were somewhat out of the ordinary. These have worked out well in practice, and a large tonnage is now being secured and prepared for market with but small expenditure of power.

It is seldom that a well sunk for water reveals a good-sized deposit of anthracite. This was what occurred, however, when the Girard Estate looked for water on Locust Mountain just north of Shenandoah.

Having found that the estate was richer by an unknown amount of coal than it had been supposed to be, the trustees examined the deposit by drilling and sinking shafts. This work showed a considerable body of coal lying in a long, narrow basin on the summit of the mountain. This tract was accordingly opened to bidders.

In reality there are two basins in this tract, the Mammoth bed lying in the center of each and the Skidmore and Seven Foot measures outcropping around the edges. The Big Buck Mountain and Little Buck Mountain underlie both small basins, forming the larger basin which incloses both of the smaller ones.

Doubtless there are other tracts similar to this in the anthracite district or possibly outside of its limits as now known, though probably not far from them. The whole anthracite region is one of extensive foldings, and only the larger anticlines and synclines have been thoroughly mapped. Imposed upon these larger folds are innumerable smaller ones, and some of these have preserved the coalbeds by carrying them below the point to which the surface has been eroded.

This is the case at Locust Mountain. The mountain itself is a large fold, and there was no reason to suppose that the coal had not been entirely eroded from the summit. The top of the mountain is nearly level, rather swampy and apparently worthless, and it had never been thoroughly investigated. The drought that led to the drilling was a fortunate circumstance for the Girard Estate.

Prospecting showed the presence of coal over an area of 383 acres, and the estimated amount was a little over 9,000,000 tons. Several operating companies bid on the tract, but Weston Dobson & Co. offered the highest price. The high royalty offered by this company was made possible by the plans of operation contemplated, which in some respects differed materially from those of other bidders.

Other operators who examined the property with the idea of bidding planned to sink a shaft at the summit of the mountain and hoist the coal, preparing it in a breaker which also was to be built on the mountain. Weston Dobson & Co. looked at the matter in another light. Its plan contemplated a tunnel which would reach the bottom of the basin, and a breaker near the foot of the mountain so located that coal could go by gravity from the portal to the breaker and through it to the cars.

*Scranton, Penn.

It planned to take out a large amount of coal by stripping, and in a considerable portion of this work it is using methods which are far more economical than those which have hitherto been possible. It planned the arrangement of the tunnel and the gangway so as to make haulage cheap. It also contemplated a system of mining which is unusually economical and which brings the expense of ventilation down to a low figure.

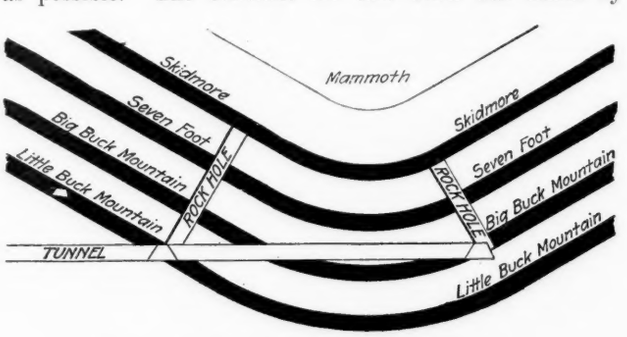
The confirmation of these plans involved some rather delicate work. The only piece of ground in the vicinity which was not unstable from the effects of mining was a small tract lying over the No. 3 slope of the Lehigh Valley Coal Co. The Girard Estate was fortunately able to so arrange matters that the operating coal company could obtain the use of this site.

Results Have Justified Expectations

The whole plan has worked out well. Starting from the inner end of the tunnel, the coal travels down a 1-per cent. grade to the portal. On this grade the cars will almost move by gravity, so that haulage expense is greatly reduced. From the portal the pit wagons gravitate to the breaker, and through it the coal moves entirely by gravity. Outside haulage is thus insignificant, and the only elevators in the breaker are those which handle the lip screenings.

A considerable amount of the coal is being removed from the mine by stripping. This operation is interesting, and some good ideas are employed in it. Probably the most impressive of these is the use of a large dragline excavator operated electrically. About 40 per cent. of the coal will eventually be stripped, while the remainder will be mined by underground methods. The date of expiration of the lease will hardly give the company time to remove all the coal.

This is one reason for driving the tunnel as rapidly as possible. The contract for this work was taken by



CROSS-SECTION OF THE COAL BEDS

Dolan Bros., of Pottsville. They imported Colorado tunnelmen to do the work and pushed it with all possible speed. All drilling was done with Ingersoll Leyner drills. Holes were shot with cap and fuse. The tunnel is 3,850 ft. long, 12 ft. wide, and 7 ft. high in the clear, with a ditch at one side 4 ft. wide and 2 ft. deep. The average rate of progress was 15½ ft. per day, the best day's work being 24 ft.

The property has been developed at a remarkable rate. The lease was closed in January, 1913, after which it

was necessary to prepare plans for the operation in detail and make arrangements for the site of the breaker. Ground was broken about Apr. 1, 1913, and the first coal was shipped on Apr. 1, 1914. During the year which thus elapsed between the breaking of ground and the first shipment, the whole surface plant had been erected, stripping equipment installed, the tunnel driven, the gangway driven to a considerable distance, rock holes drilled and mining commenced. Both the surface and underground haulage systems had also been installed. During the succeeding 12 months the tonnage had been brought up to about the capacity of the breaker, which is approximately 500,000 tons per year.

The breaker capacity is soon to be increased to about 1,000,000 tons annually. In order to get the full tonnage as early as was done, it was necessary to draw from the stripping more than its proper share of the output, and for a short time the stripping furnished approximately 80 per cent. of the coal handled. The development of the mine has now progressed to such a point that it is supplying its proper part of the tonnage; namely, about 60 per cent.

The Underground Transportation System

The main tunnel reaches the Little Buck Mountain bed a little above the bottom of the basin. A gangway is driven east and west in this measure, and chambers are opened from it. To work the upper portion of the bed another gangway is driven about halfway between the bottom of the basin and the outcrop, and connected to the level of the tunnel by a plane.

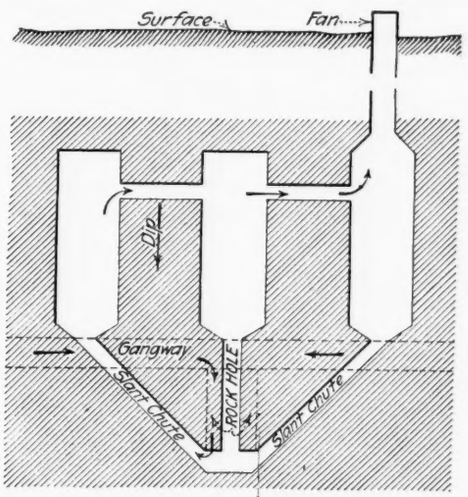
From the gangway driven at the tunnel level in the Little Buck Mountain bed, rock holes are driven to the other beds at such grades that coal will slide down on sheet iron. These rock holes are placed at intervals of 150 ft. From the place where each hole reaches each bed three chutes are driven, the middle one of these up the dip and the other two at an angle sufficient to let coal slide in iron chutes; that is, at "sheet-iron pitch." From these chutes the chambers are opened 25 ft. wide and on 50-ft. centers; thus three chambers are opened from each rock hole. As soon as the chambers are finished the pillars are drawn back and the place abandoned.

The tunnel is extended across the basin to permit the north side to be worked in the same way. Here, however, the gangway is in the Big Buck Mountain measure, and the rock holes will be placed at 300-ft. intervals. This will also prevent serious delays in the handling of coal which would occasionally occur if the whole mine was dependent on a single gangway.

The plan of ventilation deserves mention because of its simplicity and cheapness. The beds are not gassy, so that there is no necessity to provide for the removal of anything except the air fouled by breathing, decay of timbers and the burning of lamps. Sufficient air is, however, supplied to satisfy the requirements of the law.

Furthermore the amount of open space to be ventilated is probably smaller than in any other anthracite mine of the same capacity and development. The plan of mining, as previously mentioned, involves the drawing back of the pillars as soon as the chambers are completed and the abandonment of the worked-out area. Therefore the live workings, which under this system will never be of great extent, constitute the only space requiring ventilation. It is the absence of gas, the small territory to be ventilated and the opportunity to make openings to the surface for several fans which make the success of the system possible.

While the first chambers were being driven, compressed air was used for ventilation, but after an opening had been made to the surface, a 5-ft. Stine disk fan was installed. Several of these fans are now in operation. Each is driven by an induction motor of two speeds, 600 and 1,200 r.p.m. Each motor develops 7½ hp. at



PLAN OF WORKING AND VENTILATION

slow speed and 15 hp. at full speed. The fans operate to draw the air out of the mine. This air enters through the tunnel and through the numerous openings that are made as different chambers break through to the surface.

Of course disk fans do not develop much pressure, and it is not possible to ventilate a large district with a machine of this type. Such fans are, however, cheap and are easily moved, so that one is put in wherever it is needed, openings being made to the surface for this purpose. The fans are light, and the whole outfit, including the motor and house, can be easily moved.

By this arrangement there is no separate airway to be kept up, and the only openings through which air circulates are those used for the movement of coal or its production. There are no extensive fans or fan housings, and each machine ventilates its own part of the workings and is independent of all others, so that if the ventilation of any one should for any reason be interrupted, the other parts will not be affected. This is probably the cheapest ventilating system in the anthracite region.

Outside haulage amounts to very little, since the cars proceed to the breaker practically by gravity. A car haul is employed to raise the empties so that they will drift to the portal. Empties for the stripping are raised by a second car lift so that they can run by gravity to the foot of the plane.

The breaker is not complicated. Care is taken to produce clean coal and to prevent breakage. Most of the cleaning in the breaker is mechanical, and only nine breaker boys are employed.

Part of the coal breaks into flat pieces, which makes jigging difficult. This obstacle is overcome by the use of a Norman separator. This machine has not been widely introduced, but it does excellent work here. It consists of a series of iron rolls set parallel to each

other, sloping so that coal passes easily over them. They are spaced far enough apart to let flat pieces fall through between adjacent rolls. All rotation is in the same direction. Chestnut coal is fed at the upper end, and as it slides down, the flat pieces of coal and rock fall through, while the others pass over. The rotation of the rolls prevents clogging and tends to roll pieces over, so that all have a chance to go through.

As the rolls all rotate in the same direction, there is no crushing action. This separator is successful when the amount fed is not above a certain capacity, but if too much is fed so that one piece lies on others, the rollers do not have sufficient grip on the coal to separate the pieces, and it is possible for some pieces to ride down the separator supported by others having no opportunity to fall through between the rolls. This is really an illustration of the virtue of the machine, for if there is not enough friction to disturb such groups there is certainly no abrasion. It signifies merely that this machine, like other separators, cannot handle more coal than its proper feed. Its capacity, however, is quite large, as all the crushed chestnut passes over it.

Both products of the Norman separator go to jigs, the rounded and the flat pieces being jigged separately. This separation makes it possible to clean the coal thoroughly. It is well known that flat and rounded pieces cannot be jigged together with satisfaction, but that rounded coal can be easily separated from bone and shale of the same shape, and flat coal from flat slate. The flat coal from the jigs is sold as flat chestnut at a lower price than ordinary coal of this grade.

Spirals Are Fed by Shaking Chutes

A device which has considerably improved the work of the spiral separators is the use of a shaking feed chute. This is set at a slope too small to allow the coal to slide without the aid of shaking motion. By the use of this device the coal has an interrupted travel and reaches the spiral with almost no velocity, merely dropping off the end of the chute. Before this was employed, the work of the spirals was affected adversely by the velocity with which the coal reached them.

To prevent breakage of coal from falling into the pockets, the White receding chute is employed. This is a telescoping chute whose lower end extends across the pocket when this is emptied, gradually receding as the pocket fills. As soon as a little coal enters the pocket it fills up to the level of the chute; thus only a small amount of coal needs to fall from the end of the chute, and most of what enters the pocket merely slides down to the top of the heap, where it rolls gently down the slope.

This operation of the chute, which keeps its end always extended to the coal except when the filling begins, is obtained by attaching the movable lower end to a movable battery or partition which extends across the pocket at right angles to the chute. This battery, with the section of the chute to which it is attached, is supported on a sloping track, so that it runs downward and forward when the pocket is empty. As soon as the coal fills up the space under the battery, the pressure causes it to recede, taking the lower end of the chute with it; thus the pocket is not filled up from the bottom over its entire area, but a vertical section is first filled, and the filling then proceeds across the pocket.

The whole colliery is operated electrically, except that coal is burned for heating. Power is purchased from the Harwood Electric Co., and is received at 4,000 volts, but is stepped down to 440 volts for use. The power costs are interesting. In a month of full operation these were as follows: Ventilation, 0.13c. per ton; transportation, 1.27c.; preparation, 0.9c.; miscellaneous, 2.11c.; total, 4.41c. per ton. The cost for transportation was almost entirely for inside haulage, as the outside transportation was negligible. This includes nearly the whole cost of power for moving the coal, as no mules are employed. It does not include, however, the cost of fuel for the steam locomotives.

The facts embodied in this article were kindly furnished to the writer by T. M. Dodson, general manager, and B. H. Stockett, superintendent, of the Locust Mountain Coal Co.

Gaylord's Mistake

Gaylord had made a mistake; at least, most people would have called it a mistake. Fortunately for Gaylord, however, he had learned somehow or other that a mistake is a mistake only when you admit it and the world is never quite sure until you do admit it.

Not for a minute would Gaylord admit it. He was a clerk in a retail coal yard in Philadelphia at $40 per month. It was a small business, and he saw that he had about reached his limit so far as salary was concerned; besides he was ambitious. He had always secretly admired the bright young men who represented the various mining concerns in the sales of coal to the dealers. So much did he admire them that at the age of 25 his sole ambition was to be one of them.

With this end in view he talked confidentially to every salesman who came into the office and asked them to be on the lookout for any chance they might hear of for him to slip into a selling office as a clerk. He felt that to be a salesman he would have to learn the *modus operandi* right in the sales manager's office.

One day the chance came. The Blank Dash Anthracite Mining Co. wanted a young man to write postal cards reporting the car numbers and weights of shipments to the customers and make up tonnage statements on the side. The salary was $35 per month.

Now $35 isn't much money anywhere, and as it was $5 less than $40, it took some nerve to make a step down to a lower salary. But Gaylord had the requisite nerve; he knew what he wanted and he went to it.

But at the end of three years he was still a postal-card clerk at a salary of only $40, and with a score or more of men ahead of him whose eyes were set on the same goal as his. It was about this time that people began to say that Gaylord had made a mistake, for the yard he formerly worked in had been taken over by a young man and was a pronounced success in the trade under the new management. But never a word was heard from him, and his face wore an almost constant smile. He was a likable fellow and had a way of looking one square in the eye that gave an impression of earnestness behind the smile. No one could recall that he had ever said an unkind word about anyone.

And he never lost faith in himself. He was persistent, and never a month went by that he didn't press the boss for something better or a little more money. Coming

from anyone else this constant seeking of promotion would have been irritating, but somehow the boss, who had no great reputation for good humor, just couldn't be annoyed by Gaylord, even though he had told him several dozen times that he would just have to wait and be patient.

Then one day Gaylord failed to appear at the office, but a letter arrived in his stead. In it was his resignation, and the letter fairly breathed the politeness of the writer. No, he didn't have another job, but he was on his way to Pittsburgh and surely thought he must get a job selling coal for somebody. The first call was at the office of the Blake Valley Coal Co.

"I can sell coal," he said to the sales manager, "and I want to do it for you. How about it?"

The manager smiled, but shook his head. Then he thought a minute as an idea seemed to strike him.

"How would you like to tackle a new territory? We've been anxious to get into Reading for a long time and—"

"I'm your man!" eagerly gasped Gaylord.

In less than a week he had equipped an office in Reading, and inside of a month by his polite, dogged persistence he had sold enough coal to at least cover expenses. He grew better day by day and his salary grew with him. He had made good.

While at first most of the old men were inclined to smile at the young fellow without experience, selling a coal that was none too good in quality, their smiles soon disappeared. Gaylord was getting orders, but there was one order that he particularly desired. He wanted to furnish engine fuel for the Philadelphia & Reading Ry. Having added several other grades of coal to his line, he knew he had the goods.

He learned that the late president, Mr. Baer, spent a certain day each week in his office in the Baer Building in Reading, and he also knew that Mr. Baer made the fuel contracts. Try as he would, however, he could not gain an interview. Every Thursday found him in the Baer Building waiting at the elevator, and when Mr. Baer arrived, Gaylord approached him on the subject; and maybe he didn't make the most of those few moments!

He kept this up for two months almost without fail, and finally one day Mr. Baer invited him into his office. He presented his case so well that after a half-hour interview he got an order. It was not very large, to be sure, but that order grew until it was one of the nicest pieces of business ever handed out by the Reading.

There was no doubt about Gaylord being a salesman now. His own company not only knew it, but other and bigger concerns as well. He no longer needed to hunt jobs; they came after him. He fairly outgrew the Blake Valley Coal Co., and selecting one of the many good offers made to him he far exceeded his original ambition, but with it all still called himself a salesman.

But he was not satisfied merely with selling coal. He lived it and studied it. He knew what it was to fire a boiler and tried handling the tools of the miner beneath the ground. He studied in the public library until he forgot more than most people know about fuel.

One day while in the mining fields of West Virginia, he asked a mine owner what he would take for his property. In six months he turned that property over at a profit of $7,500! All this has happened in the course of the last few years. Now Gaylord is in the mining business for himself, as a vice-president of a rapidly growing company, and he is still a young man.

What was the reason for his success? The reader of this article will probably discover several, but we think not the least important one is the fact that this man had faith in himself—the faith that not only moves mountains, but the coal underneath it as well.

True? Well go to Philadelphia and be introduced, but his name will not be Gaylord, of course.

Means Electric Gas Detector

The increasing use of self-contained portable electric lamps in coal mines has created a demand for a device, other than the ordinary flame safety lamp, for the detection of the presence of inflammable or explosive gases. A detector of the electrical type has been developed by C. M. Means, of the Randolph-Means Co., Pittsburgh, Penn., that promises to serve that purpose.

It consists essentially of two glowers placed in a vertical position side by side and inclosed with gauze and glass. The gauze is used to permit the free circulation of air or gas and prevent the communication of flame to the outside in case an ignition should take place inside the inclosure. The glass is used for observation purposes. To this inclosure is attached a handle which may contain dry batteries such as are used in an ordinary flashlamp, or it may only contain the cord connections in case a storage cell is used.

The battery which furnishes energy to operate a cap lamp may be used to supply electric current to the glowers by attaching an additional cord, and the energy used for the detector will not appreciably shorten the time the lamp burns, for only a small amount of current is required to energize the detector. The device can be made rugged and of such size as will allow of its being easily carried in the pocket.

One Glower Brightens and the Other Dulls

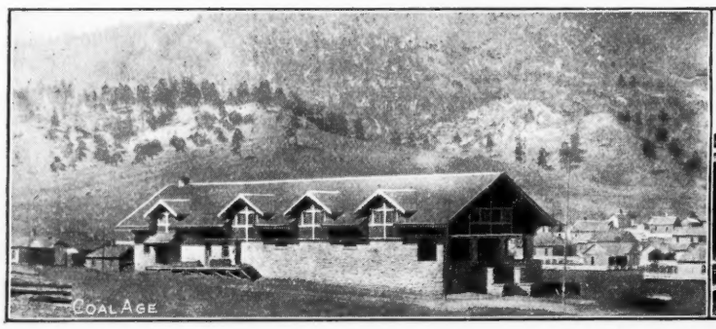
To use the detector it is necessary to press a button, which energizes the two glowers, heating both to a dull red. In air containing no inflammable gas both glowers will be of exactly the same color, but in methane or other inflammable gases one of the glowers will increase in temperature with a corresponding increase in luminosity, while the other glower will decrease in temperature and give accordingly a reduced emission of light. The relative difference in temperature and luminosity indicates the percentage of inflammable gas present.

It is claimed that this device can be constructed to indicate the presence of 0.5 per cent. of methane, but the most practicable device is intended to clearly indicate the presence of 2 per cent. or more of gas. It can be so operated that no ignition will occur inside the inclosure no matter what the percentage of gas may be, as the temperature of the glowers can be kept sufficiently low so that the glow will not ignite the methane even when mixed in ignitable proportions. A sufficiently high temperature will be reached, however, by larger percentages, but that is unimportant, for when the glower by reason of the greater percentage of methane becomes hot enough to ignite the mixture, the latter will be too full of methane to sustain combustion.

No attempt is made in this device to record accurately the percentage of gas present, but to indicate only whether explosive gas has been encountered in dangerous quantities. With care the percentage can be closely approximated.

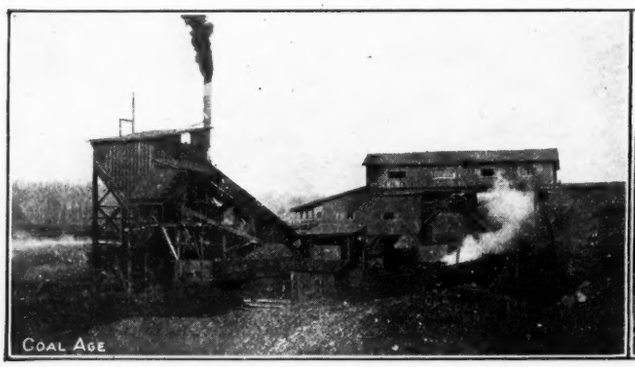
Snapshots in Coal Mining

TWO VIEWS OF MINERS' HOUSES, EMPIRE COAL CO. IN ALABAMA



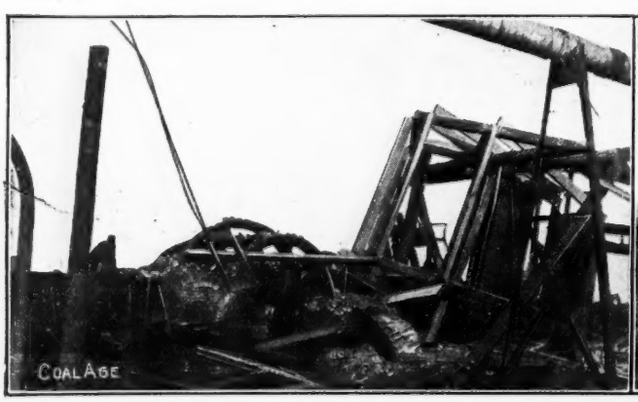
COLORADO FUEL AND IRON CO.'S STORE AND MINERS' HOUSES AT TERCIO, COLO.

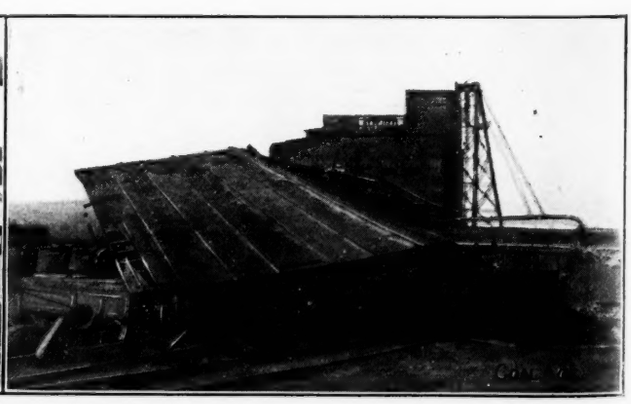
NO. 11 MINE OF PITTSBURG & CHEROKEE COAL AND MINING CO. IN KANSAS



KINGSTON COAL CO. AT WHITE CITY, KY.

TIPPLE OF ST. BERNARD MINING CO. IN KENTUCKY





WHAT A STORM CAN DO TO THE SURFACE PLANT OF AN ANTHRACITE COLLIERY

Inspector's View of Mine Safety

By Nicholas Evans*

SYNOPSIS—Erroneous public opinion of relative merit for safe mine management in different districts, based on the statistical reports giving tonnage per fatal accident for the several districts, without stating the different mining conditions. Need of a more practical mining estimate when expressing opinion on relative safe mine management. The district having the largest tonnage per fatal accident is not always the one that merits the highest praise.

We have more than once found the public much interested in the newspaper reports of the various mine inspection districts as they appear from time to time. People are anxious to learn what was the tonnage of a certain district and the tonnage per life lost.

When they have learned these few facts they immediately begin not only to form, but to express their opinion as to the cause of such favorable or unfavorable reports. This premature judgment is given both by men who are not familiar with the conditions in the mines and in many cases by men who would have us believe that they are very familiar with every detail connected with mining; and among the latter are to be found mine foremen, superintendents, managers and operators.

The general public naturally believes that, because these men hold positions of authority at the mines, they know all the facts in the matter on which they express their opinion and so much credit is given to their statements.

The result of such reports being read by people who base their calculations on the standard of mathematics gives rise to many unjust comparisons that we find so often quoted in our industrial papers and mining journals.

It is common to find the number of tons of coal mined per life lost in one district, county or state compared with that in another district, county or state, but the report fails to give other data that should be known in order to inform one who is endeavoring to make a just comparison, as to where the greatest care and caution has been taken.

A Mathematical Conclusion

To say that a district in which 400,000 tons of coal is produced per fatal accident has a better or more favorable showing than a district where 250,000 tons is produced per fatal accident, the number of men employed in each district being practically the same, would be to arrive at a purely mathematical conclusion.

A practical mining man familiar with the conditions met in various coal mines would ask some of the following questions before he would feel justified in expressing his opinion as to which of these two districts made the more creditable showing: "Have the mines in both districts the same conditions of top and bottom? Have they the same height and nature of coal seam? Do they employ the same grade or class of miners, as regards nationality and intelligence? Have the mine foremen and their assistants the same degree of support from the management of the mine in both districts?"

From the replies to these questions we learn that some of the conditions in one mine are very different from those in another. Perhaps both mines are working the same seam of coal, but more shallow, loose and dangerous top may be found in the mines of the district with the smaller tonnage per life lost. The nationality of the employees may be about the same, yet we find that there are more of one nationality injured in one district than of the same nationality in another district.

The system of haulage in one district is principally by rope and mule, while in another it is electric locomotion. The mine foremen may be of about the same grade of intelligence in both districts, but there are other differences in them that will tend to produce very different results in their mines.

Evidences of Good and Bad Management

Many operations give evidence by the conditions found in and around the mines that the mine officials are striving to keep their mine in a lawful, workmanlike condition. They insist on their employees using their best judgment and ability when doing any piece of work. Other mines give evidence equally strong in an opposite direction, showing that the management is indifferent to conditions in and around their mine. They aim only to have their mine in a condition simply to pass inspection and are not interested in the amount of care or judgment used by their employees. Some superintendents show themselves to be "men among men" and are well qualified in every particular to fill the position with credit to themselves, pleasure to their employees and profit to their employers. Others appear to be holding such a position in spite of a lack of knowledge of mining in detail and sometimes in spite of good principles. Men familiar with the details of mining or with mining at the working faces can readily understand how any or all of these conditions greatly affect the condition of a mine, for in most cases the employees are inclined to follow the example of their employers.

We have heard men say that a certain mine must be dangerous because so many men are killed in it, and that a certain other mine must be safe because of its freedom from accidents. The reasoning in both cases may be good, but the conclusions are not necessarily correct, for some mines that are in excellent condition as far as being well managed, well ventilated, well drained, well kept, well patrolled by foremen and assistant foremen and thoroughly inspected by the state inspector, have as many men injured as others that are not in nearly as good condition in these respects.

It is not my intention to say that the method of making comparisons between districts, counties or states is wrong, but to try to show that there are a great many more important factors that should be considered before we can give the most credit to a district where there is a small tonnage produced per life lost.

Mining as an occupation has always been and will always be, to a great extent, a very hazardous occupation, requiring constant vigilance, watchfulness and care on the part of every individual to guard and protect himself

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from the dangers incident to mining. I have observed that the employees of coal mines are not chosen as are the employees of large industrial establishments.

If the mine foreman needs a miner or other employee, he proceeds to engage the first applicant for a "job." About the only qualification he requires of the applicant is that he can at least walk. But we find men in the mine who have to use artificial limbs as means of travel; men with very poor eyesight; men who are deaf and men who are mutes. The same lack of qualification is shown in regard to their intellectual abilities.

Greater Care Needed in Starting New Men

In some mines men are hired by the foreman or his assistant, taken into the mine, assigned to a place to work, given a few instructions as to the width of the place, and the general direction in which it is to be worked; then the new employee is left to shift for himself. If he succeeds in avoiding an accident he begins to feel that the work is not so dangerous, and that the mine is safe and in good condition. In other mines a man is employed, taken into the mine, shown the place to work, given the same instructions, and besides this is given the extra attention of the foreman perhaps twice a day and cautioned to secure and make safe the top or side of his place. But this man meets with an accident notwithstanding all the attention that has been given his place by the foreman. As a result the place is considered dangerous, and the mine or part of it is condemned as being unsafe, but the trouble was with the man, because he did not use reasonable care and caution.

The miner is subject to a great many more dangers than the public generally conceive, for he is working at the mining face; he is opening up new and dangerous conditions every day and these call for immediate attention and quick action. It may be these conditions are found in the coal, the top, bottom or sides, but in any case the miner must prepare to keep himself safe. If he is a careful and watchful workman these things will receive his immediate attention. Another miner, who perhaps can mine as much coal as the former, meets the same or similar conditions in his working place, but does not consider them important enough to demand immediate attention, and an accident happens because of this man's failure to regard conditions with the same caution as the other miner.

Miners' Neglect Causes Many Accidents

Many miners try to persuade themselves that certain conditions are "safe" and "all right" simply because they want them to be so, in order that they may carry out their plan to first drill a hole, or load a wagon, or take out another cut from the face before they give attention to the loose top or sides. We often hear it said at investigations that the victim was going to put in some timbers when he had loaded a wagon, or fired a shot, or done some other little job that could have waited until the place had been made safe. It is this spirit of indifference that comes from carelessness, recklessness and ignorance, shown by so many men working in the mine, that causes so large a death and accident rate in many of our mines.

France has been said to have the most dangerous top in her coal seams of any country in the world, and yet her percentage of accidents is as low as that of any other country. There are fewer explosions in very gaseous mines than there are in mines where only a small quantity of gas is given off. A certain coal company in Pennsylvania has been on the honor roll, having worked its mines for 14 years and not had a man fatally or seriously injured, and the writer has known that some of this company's mines were very dangerous and there was much loose top.

How can we account for these facts? There is but one way, and that is to conclude that the men know they are working under dangerous conditions and, as a result, take no "chances." So we often hear it said: "There are fewer men hurt under bad top than there are under good top." Of course, I do not wish to imply from the above facts that it would be wise to let all mines get into a dangerous condition in order that fewer men would be hurt; but to show that if men were required to use the same amount of care and caution in our modern, and practically safe mines, that they feel compelled by the first law of nature—self-preservation—to use in the more dangerous mines, and under the more dangerous conditions, then there would be a considerable decrease in the number of accidents in the mines.

Qualifications of Coal Miners

Now to advance new ideas that can be put into practice and that will require men to use more care in the mines is a more difficult matter than to give one's views as to why and how men are injured. There are no lawful specifications as to what the qualification of a miner shall be, and if there was a set standard of intellectual ability, there would be no means of determining a man's practical judgment except by letting him gain experience at the working face, and that after all is the method that was adopted years ago, and is still practised with serious results in many cases. A possible help would be to require that the assistant mine foreman in all mines shall have had a certain number of years experience as a practical miner at the working face of headings, rooms, and pillars, so that he can from his practical experience and knowledge give intelligent instructions to the miner and direct him in a proper manner how to keep his place in a safe condition at all times.

Maintain a high standard of discipline at the mines so that men will respect and obey their instructions and know that a failure on their part to obey will cause them at least a monetary and perhaps a more serious loss. Such discipline will soon have the effect of compelling obedience to all instruction and laws.

I would suggest that a more speedy and direct method of dealing with violators of the mine law be established, such as giving the justice of the peace power to assess fines for violations of the law where only the violator was endangered by his own action. Such a procedure would help to teach the miner that the first law of nature was self-preservation; it would obviate the excessive charges, and long delays that now follow the giving of information against such violators, and the informant would feel more justified in his action when he knew that the violator would be speedily and reasonably punished. If it was necessary to make him pay a fine for his failure to take the necessary precaution to protect himself, that would be a charitable act on the part of the informer, rather than to see him pay a large doctor's bill or his family forced to pay funeral expenses.

Bureau of Mines Improvements in Breathing Apparatus

SYNOPSIS—The Bureau of Mines breathing apparatus supplies oxygen as needed by the wearer. The cartridges have wire-gauze screens dipped into molten caustic soda, no caustic potash being used. The amount of oxygen remaining in the cylinders can be gaged by touch. The parts are all completely hooded so that they are not liable to injury. Leakage from the reducing valve is announced by a safety-valve whistle.

The United States Bureau of Mines announces the completion of a new breathing apparatus which has been developed after much study and experiment. In January, 1914, the director of the Bureau of Mines commissioned William E. Gibbs, a mechanical engineer of New York City, to undertake the investigation of the problems involved and to construct a new type of apparatus in which the results of his research should be embodied. Columbia University kindly placed a laboratory at the disposal of the Bureau of Mines for this purpose.

Rescue crews have to work hard in the poisonous atmosphere of a mine after an explosion or fire, and the breathing apparatus they wear must be of the best design and construction. It must be absolutely reliable, must supply an artificial atmosphere of great purity, must be as light as is consistent with strength and should impede the movements of the wearer as little as possible.

It is believed that the apparatus described in this report is of such a type, being a self-contained unit carried wholly on the back of the user. Practical tests of this apparatus will be made by the Bureau of Mines before it is formally approved. Patents covering it have been issued in behalf of the United States Government and dedicated to the people.

The apparatus is light and its parts are well protected against injury. By means of a special device oxygen is supplied at the rate it is used, and although plenty is available for the wearer when working hard, none is wasted when he is resting. Hence the new apparatus may be worn for a much longer time without recharging than can models now in use. An unusually efficient carbon-dioxide absorber, which liberates little heat, is another feature of the apparatus. Caustic soda, which is much cheaper than the potash salt formerly thought necessary, is used as the absorbent.

Theoretically it is easy to supply an artificial atmosphere for two or three hours to a mine-rescue man by means of an apparatus of no greater weight than he can readily carry on his back. In practice, however, many difficulties are met in the construction and operation of such devices. The knowledge that the failure of any part to respond to the needs of the wearer means his almost certain death places a heavy load of responsibility on the designer and constructor of mine breathing apparatus.

A few words on the process of respiration will help to make clear what follows. Normal air contains roughly 20 per cent. of oxygen, mixed with about 80 per cent. of nitrogen and a trace of carbon dioxide. At each inspiration part of the oxygen combines in the lungs with carbon, which is brought to it by the blood, and the air when expired contains about 4 per cent. of carbon dioxide (CO_2). The nitrogen of the air is unchanged by the act of respiration and takes no active part in it.

Excess of Oxygen Should Always Be Provided

For all practical purposes an artificial atmosphere of pure oxygen, or oxygen containing only a small percentage of nitrogen, is actually preferable to normal air under the conditions surrounding mine-rescue work. In spite of the general belief that pure oxygen is unsafe to breathe,

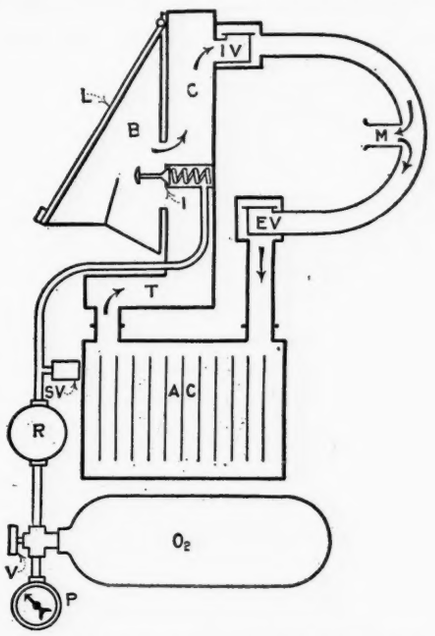


FIG. 1. DIAGRAM OF PARTS AND CIRCULATORY SYSTEM IN BUREAU OF MINES RESCUE APPARATUS

L, weighted lever; B, breathing bag; C, cooler; IV, inhalation valve; M, mouthpiece; EV, exhalation valve; I, admission valve; T, tube; SV, safety valve; R, reducing valve; AC, absorbent cartridge; V, valve to shut off oxygen when apparatus is not in use; P, pressure gage; O_2, oxygen cylinder

no abnormal effects attend its use unless it be breathed for a much longer period than that during which rescue apparatus is customarily worn, and even then there is only a slight irritation of the bronchial passage.

The amount of oxygen consumed in the body is precisely the same when the gas is breathed in a pure state as when it is diluted with nitrogen in the form of air. There is no flushing of the face, no feeling of exhilaration, no increase in the pulse rate, nor elevation of arterial tension. Yet it is only a few years since the reverse of each of these statements was believed.

If, on the other hand, the oxygen content of the air is materially reduced, unconsciousness and death are almost sure to follow without any warning symptoms, provided the CO_2 content is kept low. For this reason it is advisable that breathing apparatus shall supply an atmosphere rich in oxygen. Moreover, much of the oxygen that is made from liquid air contains 2 or 3 per cent. of nitrogen, and as this remains unchanged in the apparatus, analyses of the air breathed by the wearer gen-

erally show a decreasing oxygen content proportionate to the length of time the apparatus has been used. If the proportion of carbon dioxide in the artificial atmosphere rises much above 2 per cent., deeper breathing or panting warns the wearer of danger, generally in time to let him get to safety.

It must be remembered that under the best conditions the exploration of mines in which there has been a recent fire or explosion is a hazardous undertaking, not only because of the bodily injury that may be received, but also for the reason that no mechanical breathing device can be made so perfect that it will never fail. Frequent inspection of the breathing apparatus and constant vigilance in keeping it in perfect repair reduce the dangers to the minimum.

The elements that enter into the construction of the Bureau of Mines breathing apparatus are shown diagrammatically in Fig. 1. The apparatus is supposed to be full of oxygen and to have a considerable surface of caustic soda exposed in the absorbing cartridge *AC*. When the subject inhales through the mouthpiece *M*, the valve *IV* opens and oxygen passes from the bag *B* through the cooler *C* to the lungs.

On exhalation, the oxygen, somewhat diminished in volume and containing about 4 per cent. of CO_2, issues from the mouth. The valve *IV* now closes, but the valve *EV* opens to let the mixture of O_2 and CO_2 gases pass into the absorber *AC*, where the caustic soda combines with the carbon dioxide (CO_2) to form sodium carbonate (Na_2CO_3), with the formation of some water and the liberation of heat.

Thence the purified oxygen passes by way of the duct *T* to the breathing bag *B*, which expands to make room for it. The total volume of gas then in the apparatus is less than the original volume by the amount of CO_2 taken up by the absorbing can. After the wearer of the apparatus has taken a few breaths, the bag *B* collapses sufficiently to permit the weighted lever *L* to open the oxygen admission valve *I*, when the bag *B* fills again automatically.

The heat generated in the absorber is removed from the gas by radiation, partly from the cooler *C* and partly from the bag *B* and the connecting tubes. A reducing valve *R* lowers the pressure of the oxygen from about 2,000 lb. per sq.in. in the bottle to a pressure that may be controlled by the admission valve *I*. A pressure gage *P* indicates the available oxygen. The gas may be turned off by the stop valve *V* when the apparatus is not in use.

In order to make breathing apparatus practicable, it should be mounted on a suitable frame and be supported in convenient manner on the user, and the various elements must be as nearly perfect in operation as mechanical ingenuity and good workmanship can make them.

Breathing apparatus as previously constructed employed a constant flow of oxygen from the tank of compressed gas, not because such a flow is desirable, but because of the difficulty of making a reducing valve that permits the flow to be interrupted. With such a system it is necessary to set the valve to deliver oxygen at a rate that supplies the demands of the wearer when putting forth his utmost exertion.

At all other times the supply is excessive, and the surplus must be allowed to escape through a relief valve. Besides being wasteful of oxygen this method causes much fluctuation in the pressure within the apparatus and at times makes breathing difficult.

It was felt that the first step in improving the apparatus should be to design a more perfect reducing valve, and a series of experiments led to the construction of one that satisfies every requirement. An exterior view of this valve attached to the supporting frame is shown in Figs. 3 and 4. Fig. 3 shows the interior construction. A magnalium casting contains the valve-closing tog-

FIG. 2. APPEARANCE OF APPARATUS AS WORN

An aluminum cover protects the parts from rubbing against the roof and adds but little to the weight. The apparatus is equipped with nose-breathing device

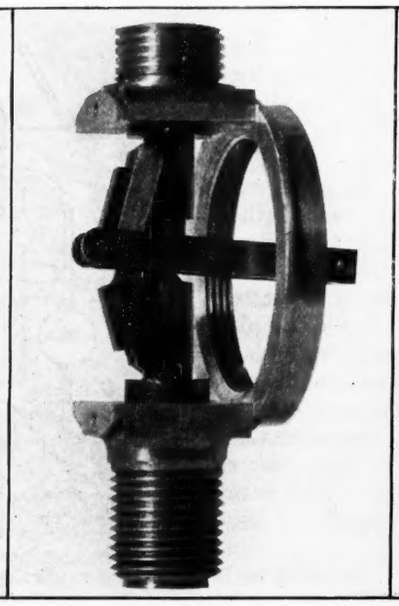


FIG. 3. DETAIL OF REDUCING VALVE

Valves are closed by a toggle action actuated by a metallic bellows. Except for a rubber gasket all parts are of metal construction

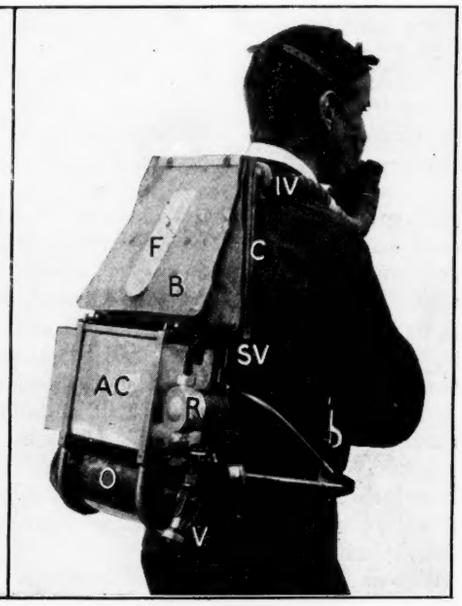


FIG. 4. APPARATUS WITH ALL PARTS EXPOSED

F, aluminum flap; B, breathing bag; C, cooler; IV, inhaling valve; SV, safety valve; AC, absorbent cartridge; R, reducing valve; O, oxygen cylinder; V, valve

gles, which are actuated by a flexible metallic bellows. Except for a rubber gasket at the junction of the casting and the bellows, all the parts are of metal.

Extreme sensitiveness is obtained and sluggishness is avoided by using knife edges for all the bearings of the toggles and by having the whole system come into nearly a straight line when the valve is on its seat. Perfect tightness and freedom from "creeping" are assured by the use of a monel-metal valve and a hardened-steel seat.

When this reducing valve is attached to a cylinder of gas at a pressure of 150 atmospheres, the pressure within the bellows when the outlet is closed is about one-sixth of an atmosphere. This remains constant even after the outlet has been shut off for several hours. Such a reducing valve makes it possible to admit oxygen intermittently to the breathing bag in the exact quantity required by the user under conditions varying from complete rest to extreme labor.

Adequate Protection to Parts When in Use

All parts of the breathing apparatus are mounted on a frame of steel tubing which is carried on the back. Fig. 2 shows the apparatus in use with its protecting cover of aluminum. Referring to Fig. 1, the cylinder or bottle of compressed oxygen *O* has a stop valve *V* connected to the reducing valve *R*, from which the gas at low pressure passes by way of the tube *T*, past the safety valve *SV* to an admission valve within the breathing bag.

The safety valve has a whistle in its outlet and blows off at half an atmosphere. The whistle is to give warning of leakage at the reducing valve. The cooler *C*, of blackened copper, supports the breathing bag, on which rests an aluminum flap *F* (Fig. 4), which rises and falls as the breathing bag expands and contracts. It bears on and holds open the admission valve *I* until the bag is about half-full of oxygen.

The operation of the apparatus is as follows: On inhalation, air from the breathing bag lifts the inhalation valve *IV* and passes by way of the flexible tube and mouthpiece to the lungs. Exhaled breath passes to the exhalation valve (hidden by the corner of the cooling can), thence down a flue to the left-hand end of the absorber, thence through the absorber, where it loses its CO_2, up through the cooling can *C*, where it loses heat, and into the breathing bag *B*.

Dioxide Absorbed on Caustic Soda Screens

Whenever the supply of oxygen in the bag gets low, the flap *F* opens the admission valve and a fresh supply enters. The absorbing can *AC* has been the subject of much experiment. The form adopted contains 20 vertically arranged sheets of fine iron-wire gauze, held parallel to each other and one-fifth of an inch apart by spacers. Before being inclosed in the can the bundle of gauze sheets is dipped into molten caustic soda (NaOH) containing 20 per cent. of water. The caustic solidifies on the gauze when cold, forming reinforced plates about a sixteenth of an inch thick, between which the expired air passes.

This makes an efficient absorber of CO_2 and has the further advantage that the plates maintain a uniform surface from which the condensed and chemically produced moisture constantly drains away, carrying with it the newly formed sodium carbonate, so that the capacity of this absorber is nearly constant until the active material is all used.

A pressure gage or "finimeter," which is read by touch instead of sight and which sounds an alarm when the oxygen in the cylinder has been reduced to 30 atmospheres, completes the apparatus. The whole device is suspended from the shoulders by leather straps.

In this apparatus there is a minimum of parts, and the connections have been made without the use of rubber wherever possible. A simple mouthpiece and nose clip is used instead of a helmet, experience having shown that the helmet is dangerous. For this reason it is no longer used by the Bureau of Mines.

The weight of the complete apparatus is 30 lb., which is considerably less than that of similar devices. The pressure within the apparatus is maintained slightly above that of the atmosphere by the pressure of the weighted flap *F* on the breathing bag. Consequently, if the apparatus is punctured, or if a crevice in any part of the system opens, the leakage will be outward only.

Exhaustive tests of the new apparatus have shown that it permits unusually free breathing; that the air supplied is always comfortably cool; that as the front of the body of the wearer is entirely free, he is not hampered in his movements; and that the parts of the device are well protected against accident. The entire apparatus can be quickly taken apart or put together with a wrench and screw driver.

Recent Legal Decisions

Specific Performance of Contracts To Lease Lands—A contract to give a coal-mining lease will not be enforced by ordering execution of the lease if the contract is not definite in its terms. (Kentucky Court of Appeals, Faulkner vs. Raccoon Coal Co., 181 Southwestern Reporter, 1106.)

Effect of Pennsylvania Mine Foremen Laws—The responsibility for the care of passageways in a Pennsylvania mine rests on the mine owner and cannot be shifted to the mine foreman so far as concerns the operator's liability for injury to employees. (Pennsylvania Supreme Court, Dobra vs. Lehigh Valley Coal Co., 95 Atlantic Reporter, 465.)

Accidents Caused by Vicious Mules—A mine mule driver cannot recover damages for injury sustained through viciousness of the mule without first showing that the animal was dangerous, that the operator knew or should have known that fact and that he, the plaintiff, did not know it. (Kentucky Court of Appeals, Bird vs. Mahan Jellico Coal Co., 181 Southwestern Reporter, 339.)

Miner's Right To Rely Upon Assurance of Safety—An employee engaged in operating a coal-punching machine was entitled to rely upon assurance given him by the operator's electrician who had repaired it that the machine was safe, unless the danger in continuing its use was so plain that an ordinarily prudent miner would not have worked with it. (Kentucky Court of Appeals, Calhoun vs. Stearns Coal and Lumber Co., 179 Southwestern Reporter, 590.)

Miner's Assumption of Obvious Risk—A miner could not recover for injury sustained through fall of a mine roof where he proceeded with work of undercutting coal after noting an obviously dangerous condition of the roof. (Kentucky Court of Appeals, Fox vs. Jellico Coal Co., 179 Southwestern Reporter, 1032.) But in cases like this, where the law imposes upon an operator the duty of inspection, and the further duty of supporting the roof by timber if inspection shows this to be necessary, the operator cannot escape liability for accident unless it appears that the duty of inspection was imposed upon the injured person, or it is shown that the danger was so obvious that a person of ordinary intelligence could, in the exercise of ordinary care, have discovered the peril. Mere inspection by the operator, however, does not exonerate him; it does not follow from the mere fact that the inspector determines that the roof is safe and that supports are therefore unnecessary that this will exonerate the operator from liability for injury resulting from a fall of roof. (Kentucky Court of Appeals, Prichard's Administrator vs. Carter Coal Co., 179 Southwestern Reporter, 1038.)

Extracts from a Superintendent's Diary

Today the hoisting engine at No. 2 slope has been able to hoist coal only intermittently because of steam shortage caused by the burning of two boiler shells last night. One of the firemen left the water-supply regulation in his battery of boilers to the watchful care of an automatic regulator while he took a little nap, and had it not been for the timely arrival of the night watchman, the fireman's nap would have been turned into a sleep that knows no waking. Owing to the quick action of the watchman an explosion was avoided, but the fireman became so frightened when he realized what a narrow escape he had had that he collapsed and had to be carried home.

As a direct result of that little nap some two hundred miners will have their earning capacity greatly reduced for several days, our company will have a boilermaker's repair bill amounting to several hundred dollars and a first-class fireman will be compelled to change his occupation or else change his residence, since our rules forbid reinstatement except in a different department.

Because no one was injured physically by the accident it may not be brought to the attention of the company's safety-first statistician to be recorded against us, but the company's safety-first inspector must be furnished with a complete report of the accident; and by the time he completes his investigation, everyone who might in any way have contributed to the accident will have been asked so many questions that it will become a sore subject to them, which is exactly what the management most desires.

Then must follow the investigation by the mechanical department to determine why the automatic regulator failed to regulate, and in all probability this will lead back to further interviews with the operating end and a call for recording charts that have long since disappeared, in spite of the fact that all charts are supposed to be filed where they may be available for at least one year. This will bring the office force into the inquiry, and everyone from the office boy to the chief clerk will have questions to answer.

After all of the investigations have been completed and the heads of the different departments have had opportunity to make such comments in writing as they deem necessary, the entire file so accumulated will pass to my office and then be turned over to the general manager for final disposition.

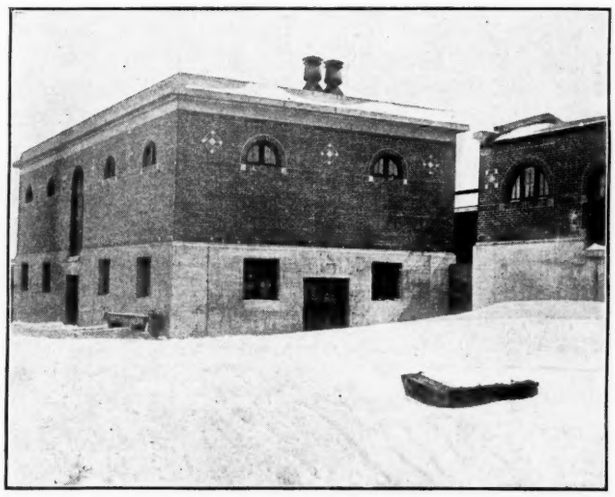
And what will become of the report after the general manager has finished with it? It will probably find its way to his file, and several years later if he or a successor has occasion to refer to it, it will have become misplaced like as not—all of which goes to show that men measured by their shortcomings are pretty much alike after all.

To the making of automatic regulators and recording devices there seems to be no end, nor will an occasional failure, such as we have just experienced, affect their popularity with managers in the least. Managers like to think of their superintendents as surrounded by recording devices to show them just what is being done by every piece of machinery on the place. But unless managers begin to realize that the filing capacity at most superintendents' offices is limited, superintendents will soon be obliged to turn their entire offices into storerooms for recording charts.

Mule Barn of Delaware, Lackawanna & Western

The illustrations show one of the latest mule barns built by the coal department of the Delaware, Lackawanna & Western R.R. Externally it is of the same design as the other colliery buildings. The lower part is used for a stable and the upper part for storage of feed.

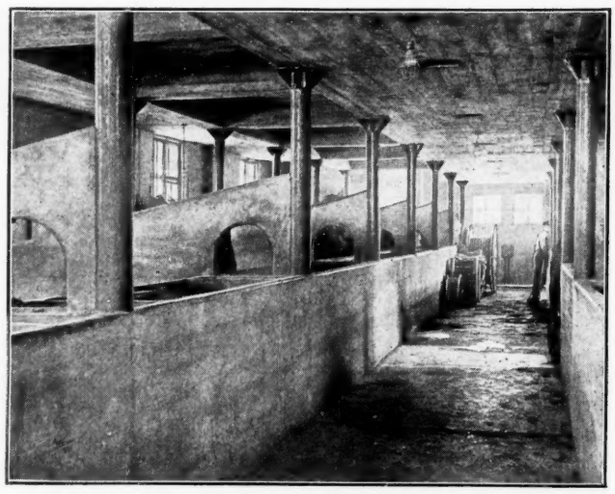
The stable has 13 double stalls, arranged in two rows facing each other; 7 are on one side and 6 on the other.



MULE BARN OF D., L. & W. R.R. CO.

The space of the center stall on one side is occupied by iron stairs leading up to the feedroom. The mangers and stall partitions are concrete, and the latter terminate in columns which support the second floor. Each manger has a deep hay trough, with a feedbox at either end. The manger wall next to the stall is cut off about 4 in. from the bottom to give room for cleaning out the manger. It has been found that this space is not quite high enough, and it is suggested that 5 to 6 in. would be better. Under each of the arches in the stall walls are two boxes in which rock salt is kept.

The floor is concrete, and this is covered in the stalls with a soft brick of wood composition. This gives a good surface for the mules to stand on, but the long,



INTERIOR OF BARN, SHOWING CONCRETE STALLS

sharp calks necessary on their shoes cut into it deeply, so that it is not as permanent as is desirable.

A ditch behind each row of stalls drains to two outlets on each side. Ventilation is through the duct lying above the aisle. The air enters this passageway through the square openings shown, and the duct terminates in a vertical chimney topped by the ventilators. The stable as thus constructed is warm, dry and well-ventilated.

A Hoist Indicator

The engineer at Bliss colliery of the Delaware, Lackawanna & Western Railroad Co. has found an ingenious means of guarding against possible confusion at a hoist used for raising coal from different levels. When the common dial indicator is employed, it is generally marked for all levels. This is perfectly simple and reliable as far as the indicator itself is concerned, but it imposes upon the engineer the burden of keeping in mind the particular level from which he is hoisting and doing so without the aid of any marks on the indicator.

HOIST INDICATORS AT BLISS COLLIERY

Stopping at any mark becomes something of a habit, and if the hoisting is changed from a lower to an upper level, there is always danger that the engineer may forget the change and pull the cage up through the top of the headframe.

At Bliss the indicator is provided with extra dials painted on sheet iron and having supporting hooks on the upper side, which are hung over the face of the indicator as needed. Whenever the drums are set for hoisting from a different level, the appropriate dial is hung over the face of the indicator and all possibility of confusion is removed. The same result could be attained by having all the marks painted on the one indicator dial and having blank sheets, cut out at the proper places, to hang over it.

This indicator is the invention of W. F. Trimble, district machinist, and is in use also at Woodward No. 2 shaft.

N. Y. Central Embargoes--II*

The New York Central R.R., under date of Apr. 15 (File No. 51), announces embargoes in effect on bituminous and anthracite coal to local and New England points (east of Buffalo) and its New England connections as follows:

1. To New York, New Haven & Hartford R.R. (including Central New England Ry.) points via Beacon, N. Y., except when consigned to hospitals, asylums and schools or to public utilities, including water, gas, electric-light and street-railway companies, or to C. N. E. stations west of Hopewell, N. Y., and Canaan, Conn., or for switching deliveries at Beacon, but not for reconsigning or reshipping.

2. To Bristol, Hartford, Naugatuck, New Britain, Torrington, Waterbury and Waterville, Conn., via N. Y., N. H. & H. R.R., whether consigned, reconsigned or reshipped, except when for hospitals, asylums and schools or for public utilities, including water, gas, electric-light and street-railway companies or for United States Army.

For all other stations on N. Y., N. H. & H. R.R. and C. N. E. Ry. coal shipments will be accepted by those roads to extent daily of one-third the average daily receipts of such traffic for April, 1915.

3. To points on or via Boston & Maine R.R. via Rotterdam Junction, Troy or Schenectady-Mechanicville, N. Y., route, except when for Boston & Maine R.R., Rutland R.R. or Maine Central R.R. fuel supply or for United States Army.

4. To Port Morris, N. Y., except when for delivery on private sidings, including those of Ward Baking Co., Norcross Bros., Shipway Bros., Knickerbocker Marble Co., McLaury Marble Co., Pt. Morris Chemical Co.

5. When sent for reconsignment to Mechanicville, N. Y. (via Schenectady and D. & H. Co.), Rensselaer, Rotterdam Junction, Syracuse, Troy, West Albany, West Albany Transfer.

Rail Rates to Pacific Coast

The following bids were received by the Bureau of Supplies and Accounts, Navy Department, Apr. 7 (see *Coal Age*, Vol. 9, p. 588), for the transportation of coal by rail and water to the Pacific Coast:

Southern Pacific Co.—5,900 tons or more from mines to Oakland wharf, $7.633 per net ton; from Oakland to alongside coal depot at Tiburon, $1.50 per net ton.

Rock Island Lines—From mines to Chicago, $2.05 per net ton; from Chicago to Tiburon, 33.44c. per 100 lb.

Union Pacific Railway Co.—5,000 tons to San Francisco, $7.635 per net ton; from San Francisco to Tiburon, $1.50 per net ton.

Atchison, Topeka & Santa Fe Railway Co.—75,000 tons (assume this means 7,500 tons); from mines to San Francisco, $7.635 per net ton; from San Francisco to Tiburon, $1.50 per net ton.

Missouri Pacific Railway Co.—From mines to San Francisco, $7.635 per net ton; from San Francisco to Tiburon, 7.5c. per 100 lb.

The Southern Pacific offer is a fraction the lowest and doubtless will be accepted. No steamers were offered.

Constant Medical Care at Mining Camps—Dr. W. A. Lynott, of the United States Bureau of Mines, recently stated at a meeting of the National Safety Council that one rarely finds cases of infectious fever or epidemics in mining camps, because the doctors, being paid on the monthly plan, are called whenever occasion demands, so that the occurrence of an epidemic is at once recognized. In cities and villages where each man calls in the family doctor only when he can no longer do without him, not only does the disease make progress before it is diagnosed, but it also becomes well spread before the doctors have begun to compare notes.

*See also Vol. 9, p. 543.

The Labor Situation

Anthracite Wage Conference

It was hoped that with the return of John P. White, president of the United Mine Workers, on Sunday, Apr. 16, the subcommittee of anthracite operators and miners would begin to whip the agreement into shape. It was thought that the only matter which had delayed progress was the absence of Mr. White at the bedside of his mother, who was seriously ill and liable to pass away at any time.

Therefore, when he returned from Albia, Iowa, every expectation led the public to believe that the anthracite operators would make a proposal, but Monday and Tuesday passed and it was not presented. The reason for the delay has not been explained.

The official statement issued by Secretary Gorman of the subcommittee at the conclusion of the day's conference read: "The session of the conference was devoted to an effort to reconcile the views of representatives of the operators and miners upon some of the matters heretofore discussed."

Whether the miners were disappointed at not receiving the expected proposal from the operators could not be learned, and no further statement regarding it could be obtained.

The diary of the conference is not particularly interesting. On Thursday, Apr. 13, the rule requiring "one contract miner to each working place" was discussed with animation. The nature of Friday's debate has not been revealed. The formal statement of the subcommittee merely stated that the delegates "resumed consideration of the demands of the anthracite mine workers." No session was held on Saturday.

President White Urges Continuance of Work

The telegram received from President White stating that he would be in New York City on Sunday morning added:

Deeply regretting the fact that it was necessary for me to absent myself from the conference during the week, I desire at this time to express my satisfaction over the progress that has been made in the clarifying of the situation, so that we can safely determine vital issues at the conference next week and arrive at a satisfactory agreement.

Say to the anthracite mine workers that they must remain firm in carrying into effect the nonsuspension policy of the national organization. Emissaries of discord should be looked upon in their true light—that of a menace to the progress of the anthracite mine workers.

The nonfulfillment of the intent and purposes of the nonsuspension program would be a serious mistake just upon the eve of the possible fulfillment of 16 years of organized effort. Every mine worker should be alert to safeguard the destinies of the organization against any possible blunder at this, the most important period in the life of the union.

Philadelphia Wage Conference

After sessions at the Bellevue-Stratford, Philadelphia, continuing from Mar. 20 until midnight of Friday, Apr. 14, a new working agreement was drawn up by representatives of the central Pennsylvania bituminous operators and miners, which, generally speaking, gives the latter an increase of 5 per cent., or as some of the operators expressed it, increases in wages estimated at $3,500,000 annually.

The new agreement, which takes the place of the scale expiring Mar. 31, provides for:

Pick mining, 75c. a gross ton; for machine loading, 44.43c. a gross ton; for drivers, $2.77 a day; trappers, $1.25 a day, minimum, and for all other day laborers, a 5 per cent. increase, raising their pay from $2.64 to $2.77 a day. All dead work and yardage is raised 5 per cent.

The operators agreed to the clause providing the check-off for both miners and laborers, and for the first time in district No. 2 they conceded the right of the miners to make special assessments for the support of the union.

It was also announced that the conference addressed a letter to all operators, urging them to give their attention to the car-pushing question, to the end that this problem may not be an issue when the time comes to make a new contract.

The full text of the new wage agreement follows:

SCALE AGREEMENT, PHILADELPHIA, APR. 15, 1916

This agreement made this Apr. 15, 1916, by and between the Association of Bituminous Coal Operators of Central Pennsylvania hereinafter called the Operators, party of the first part, and the United Mine Workers of America of district No. 2, hereinafter called the Mine Workers, party of the second part.

Witnesseth, it is hereby agreed that this contract shall take effect as of the date of Apr. 1, 1916, and continue in force until Apr. 1, 1918. Each of the parties agrees that the following scale of wages, rules and conditions shall be observed and govern, during the term of this agreement, at all collieries owned and controlled by the Operators and wherein a majority of the employees are members of the Mine Workers:

Pick mining, per gross ton, 75c.; pick mining, per net ton, 66.96c.; machine loading, per gross ton, 44.43c.; machine loading, per net ton, 39.67c.; machine mining, per gross ton (machine mining to cover cutting, scraping and loading on a tonnage basis), 3c.; machine mining, where done by day, hour, task or ton, or any combination hereof—loading, 81 per cent. of 3c. per gross ton advance; cutters and scrapers, 5 per cent. advance over existing prices, provided that the total advance per gross ton shall in no event exceed 3c. Net-ton advances to be the equivalent of the foregoing gross-ton advances; drivers, minimum per day (8 hr.), $2.7778; trappers, minimum per day (8 hr.), $1.25.

The rate of pay of the following classes of work shall be advanced above the rates paid for that class of work during the scale year ended Mar. 31, 1916:

All day labor to be advanced 5 per cent. over existing prices. All yardage rates and dead work to be advanced 5 per cent., discarding all fractions of a cent one-half or under, and adding one cent where the fraction is over one-half. The charges for blacksmithing shall be three-fourths of one cent per ton for pick mining and one-half of one cent per ton for machine mining. The Operators agree to use every reasonable effort to have the miners' tools repaired and sharpened with as little delay as practicable.

All differentials in tonnage and yardage rates existing under the 1914 scale agreement to be continued and remain in force during the life of this agreement, or until Apr. 1, 1918. All the customs, conditions and provisions existing under the 1914 scale agreement to remain unchanged during the period covered by this agreement, except as modified or changed by the following rules and regulations:

RULES AND REGULATIONS

Rule 1. If, in the judgment of the company's tipple boss or inspectors, a car contains an unreasonable amount of impurities, the miner sending out such car shall be suspended one day for the first offense, three days for the second offense, five days, or discharged, for the third offense within any thirty days, unless some other methods or discipline can be mutually agreed upon to govern at the colliery in question between the Operators and the officers of district No. 2. Dirty coal to an unreasonable amount in any car shall be placed aside for the inspection of the miners sending such car out, before suspension may occur.

Rule 2. In cases of absence from work, men must furnish a good and sufficient excuse to the foreman in charge, and unless such excuse is furnished the man offending may be suspended from work—for the first offense, two days; for any succeeding offense within thirty days, three days.

Rule 3. Except in cases of fatal accidents in the mine, the mine shall in no case be thrown idle because of any death or funeral. In the event of a fatal accident in the mine, the employees may discontinue work for the remainder of that day; but work at the option of the Operator shall be resumed the next day following and continue thereafter. Nothing herein shall be construed to prevent any employee from absenting himself from work to attend the funeral of a fellow-employee or member of his family, but any employee absenting himself to attend the funeral, who does not attend the funeral, may be suspended for three days.

Mine Committee Shall Only Adjust Disputes

Rule 4. The duties of the mine committee shall be confined to the investigation and adjustment of disputes between the mine foreman or local superintendent and any employees working in and around the mine. The mine committee shall have no other authority or exercise any control, nor in any way interfere with the operation of the mine, and in case the committee or any member thereof shall be guilty of such violation, he or they shall forthwith be removed from the committee.

Rule 5. Any local rules or special agreements in violation of this contract shall be null and void, and no local union or group of local unions shall pass any rule or regulation in violation of this contract.

Rule 6. All necessary props, rails or other supplies shall be delivered at the working places.

Rule 7. The management at all collieries shall endeavor to inform their employees the night before when there will be work on the following day, or in the event that they are unable to inform their employees the night before, they shall inform them at five o'clock in the morning, if practicable to do so.

Rule 8. Machine loaders shall work regularly when the mine works, and if the machine runners are unable to keep the machine loaders in steady work with one room the machine loaders shall be furnished with two rooms, if practicable. Should a loader fail to report for work, his room or rooms may be given to another loader for that day, but such loader must leave rooms in as good condition as found.

Rule 9. Every miner shall be given an equal opportunity to load an equal turn with every other miner doing the same class of mining, except where necessary to advance headings or aircourses, and where headings and aircourses are worked, as aforesaid, they shall be double-shifted where practicable. However, it shall not increase the cost to the Operator.

Rule 10. Where pick and machine miners are working in the same mine, the turn shall be in proportion to the ratio which exists under this agreement between the pick and machine-loading prices. A square turn shall be kept in all mines.

Rule 11. Wages shall be paid semimonthly on the Saturday nearest the fifteenth and thirtieth of each month, except at such mines where the present pay is mutually satisfactory, but there shall be two pays in each month.

Peace To Be Maintained by Commissioners

Rule 12. Should differences arise between the Operator and Mine Workers as to the meaning of the provisions of this agreement, or about matters not specifically mentioned in the agreement, there shall be no suspension of work on account of such differences, but an earnest effort be made to settle such differences immediately:

First: Through the management of the mine and the Mine Committee.

Secondly: The first method failing, the matter shall be referred to the Operators' commissioner and the Mine Workers' commissioner, permanent commissioners to be appointed by each of the parties hereto to serve during the life of this agreement. These two officials shall proceed at once to carefully investigate the cause or causes of the difficulty and endeavor to settle the point or points in dispute. The decision of these commissioners shall go into effect at once and remain in effect unless or until changed by the decision of the permanent board of arbitration, to which both parties have the right to appeal.

Rule 13. Pending a decision of the commissioners, no employee shall cease work because of any dispute, and any agreement reached at any stage of the proceedings shall be binding on both parties thereto, and not subject to revision or reversal by any other party or branch of either association, except the permanent board of arbitration.

Note to Rules 12 and 13—Regarding Rules Nos. 12 and 13 relating to the work of the commissioners and the board of arbitration, the rules are hereby renewed and made a part of this contract. However, in order to provide more expeditious methods of reaching decisions, a committee of two members of the United Mine Workers of America and a committee of two members of the Coal Operators shall meet within thirty days and jointly recommend to both Operators' and Miners' organizations within sixty days a suitable plan to accomplish the results desired. Their recommendations shall constitute a part of this agreement and govern the method of procedure of the commissioners and of the board of arbitration which have been created by Rules Nos. 12 and 13.

Rule 14. Under no circumstances will any Operator recognize or treat with the mine committee or any representative of the United Mine Workers of America during a suspension of work which may occur in violation of this agreement.

Rule 15. The right to hire and discharge, the management of the mine and the direction of the working forces are vested exclusively in the Operator, and the United Mine Workers of America shall not abridge that right; but if any employee is suspended or discharged, and in the opinion of the mine committee he has been unjustly suspended or discharged, the mine committee shall endeavor to have him reinstated; failing in their effort, they shall call upon the commissioners, who shall decide whether he shall be reinstated or not, their decision subject to appeal to the permanent board of arbitration.

Rule 16. The regular starting time of the mines in this district shall not be earlier than 6:45 a.m., and not later than 7:45 a.m., unless a different time shall be mutually agreed upon by the employer and employees.

Rule 17. No Operator shall make a deduction for blacksmithing from the wages of the employee, unless such Operator furnishes a blacksmith.

Rule 18. All members located on the Bennett's branch shall pay the same differentials that have existed during the agreement ending Mar. 31, 1916.

Miners Shall Always Have Place To Work In

Rule 19. When mines are in operation under normal conditions and the Operator does not want to pay the miner for taking out water from his working place, the mine foreman shall provide the miner with work either in another place or with other miners, if possible to do so, until his place is put in working condition. This rule will also apply to miners required to wait more than 24 hr. for a switch or curve to be laid.

Rule 20. In no instance shall the miner be required to take more than one car in any one room at any one time.

Rule 21. In cases where miners push cars to and from the face, the empty and loaded cars shall be placed on the heading at the mouth of the room; provided, however, that where mule hauling is used the loaded car shall be taken from the mouth of the room, if placed at parting accessible to driver.

Rule 22. In no case shall the miner be required to lay road or pillars in old rooms, bail water, timber bad places or clean up falls of roof not caused by the miner's own negligence, except by special agreement between the miners and mine management as to contract allowance for same, such agreement to be based on a rate of 34.65c. per hour.

Rule 23. House rent shall be the same as under the contract which expired Mar. 31, 1916.

Rule 24. Machine loaders shall not be required to do their own cutting and scraping in pillars and stumps.

Work a Month While Contract Is Considered

Rule 25. In the event of a new scale agreement not having been signed on or before Mar. 31, 1918, then and in that event the United Mine Workers of America, district No. 2, will continue all men in mines regularly at work under the wages and conditions of this agreement for an additional 30 days after the date on which the scale committee of operators and miners hold their first meeting for the purpose of negotiating a scale to succeed this present scale. On reaching an agreement to succeed this present contract, the wages paid by the operators to the miners, dating from Apr. 1, 1918, for such portion of the 30 days' work as extend beyond Apr. 1, 1918, shall be those that are agreed to in the next contract. And in case of either local or general suspension of mining beyond the above 30 days, either at the expiration of this contract or otherwise, engineers, pumpmen or other employees necessary to operate pumps and fans, hoist and lower men and supplies and provide the coal necessary for the boilers, and fully protect all company property, shall remain at work at the prices agreed to under this wage-scale agreement, but it is understood and agreed that the operator shall not produce coal for shipment under this rule, and in case of evictions by any Operator, the Mine Workers reserve the right to have all firemen, engineers and pumpers and others cease work immediately.

Rule 26. No agreement shall be made by the United Mine Workers of America of district No. 2 with any operator not a member of the association, on a lower scale of wages, or which shall provide for a reduction, under any circumstances, during the term thereof, which shall not be less than two years.

Rule 27. Eight hours of actual work at place of work shall constitute a day's work for all labor inside the mines, except pumpmen and monthly men, who shall work the number of hours required. It is understood and agreed, however, that the trip riders, motormen, drivers and cagers shall work the extra time required to clean up and deliver outside all coal gathered from working places to the side tracks within the 8 hr. of actual work, and shall be paid for such extra time worked at the rate per hour herein agreed upon. All outside labor to work the number of hours required, and to be paid as per rate specified. All outside labor engaged in the dumping and handling of coal, including mine carpenters and blacksmiths, to work the hours required and to be paid the number worked.

Rule 28. Any regularly employed miner may at his option authorize deductions of coal mined for use of checkweighmen's fund, such amount of coal as he may elect to subscribe.

Rule 29. Any regular day employee working inside or outside the mine may at his option authorize deductions for the use of the United Mine Workers of America of district No. 2, an amount equal to the regular authorized deductions subscribed by the miner; provided, there shall be no collections from mine foremen, assistant mine foremen, firebosses, or bosses in charge of any class of labor inside or outside the mine, or coal inspectors and weighbosses.

Rule 30. Special assessments for lawful purposes excepting initiation fees, fines and penalties, duly authorized by the executive board of district No. 2, will be collected from regular employees when subscribed and authorized by employees as hereinafter provided.

Employer Not To Be Liable for Deductions

Rule 31. It is understood and agreed that the deduction mentioned in Rules 28, 29 and 30 shall only be made by the employer upon authority separately and singly executed in writing by each individual employee, and which authority shall contain a release of the employer from all liability on account of such deductions, and there shall be no so-called button strikes or coercive methods of any character whatsoever used against the employer or employees to compel membership in the United Mine Workers of America or the making of the subscriptions provided for in Rules 28, 29 and 30.

Rule 32. All deductions provided for in Rules 28, 29 and 30 shall be collected through the employer's office and remitted with detailed statement to the district treasurer at Clearfield, Penn., less 5 per cent. to the employer for clerical expenses and collection. These deductions shall have preference over all deductions except pit expenses.

Rule 33. It is hereby understood and agreed that the additions to Rules 12 and 13, as set forth in the agreement expiring Mar. 31, 1916, are hereby renewed and continued in their entirety.

In witness whereof, the respective scale committees on behalf of their associations, by their proper officials, have caused the same to be signed and sealed this 15th day of April, 1916, with the understanding that the same are to be ratified by a referendum vote of the United Mine Workers organization of district No. 2, and by a referendum vote of the membership of the Association of Bituminous Coal Operators of Central Pennsylvania.

The contract is signed for the Association of Bituminous Coal operators of central Pennsylvania by B. M. Clark, president; Harry Boulton, vice-president, and John C. Forsyth, secretary, and for the United Mine Workers of America, district No. 2, by James Purcell, president; Charles O'Neill, vice-president, and Richard Gilbert, secretary.

Bituminous Mines Will Work

The mines where the union is recognized throughout the district covered by the McAlpin agreement worked steadily after Apr. 1, except in some places where the operators obviously felt they could not pay the scale. In these places the miners have raised no cry against their employers, for they realize that even if the new scale does not make conditions any worse they were already so bad as to make operation impossible. These mines are mostly in central Illinois. They had been hoping for relief from the recent negotiations and had trusted that their wage scale would be raised less than that of southern Illinois. When they found they were subject to the same increase they gave up the fight and shut down.

The smaller mines, which are remarkably inefficient, suffer more than others from the 5 per cent. increase in day wage. It is easy to see that if the coal could be obtained without day hands there would be no 5 per cent. increase to pay, and consequently that part of the advance would not affect the mine in question. Similarly therefore it is easy to realize

that a mine which has few day hands suffers least from the increase in the rating of day work. The central Illinois mines also have to pay more for dead work, as they have more of it than the southern Illinois mines, and the 5 per cent. increase in that item also militates against their ability to continue in operation.

More West Virginia Mines Have Raised Wages

Then there is the demoralizing effect of the keen West Virginia competition. If all the companies in West Virginia would do as well as the New River and Winding Gulf section—and not a few have—little complaint could be made, for the wage of pick miners has been raised from 40c. to 43c. per ton, or 7½ per cent.

The wage of machine loaders was increased 1.8c. per ton, from 30c. to 31.8c. Whether that is the equivalent of the rise in the area covered by the McAlpin agreement is not so clear. But the miners who cut the coal get the 5 per cent. increase for day labor, and all dead work, yardage and day-work are similarly granted a 5 per cent. increase.

Of course it would be better if the advance were identical per hour in cents instead of the same merely in percentage, but the New River and Winding Gulf region could only be expected to imitate the McAlpin agreement, as written, and the operators did it as promptly and faithfully as could be expected. In the future the miners had better not give them a rule which, followed strictly, permits them to steal a slight advantage over their competitors in neighboring states. However, the improvement in their position will be slight and congratulations are to be extended to them for taking the stand they did.

Idleness Caused By Strike Which Never Came

But large numbers of central Illinois mines have closed. Whether such idleness was justified or not by the changes proposed, it was amply excused by the conditions from which the operators have for a long time suffered. Furthermore, according to Duncan McDonald, of Springfield, the secretary-treasurer of the United Mine Workers of Illinois, practically 50 per cent. of the mines of Illinois closed for two weeks to two months on Apr. 1. They have no orders and they will probably receive none till the present stocks, which were collected preparatory to a strike, have been used up. The fault is not with the miners, for they are willing to work if they are given an opportunity.

In Pennsylvania the miners of the collieries owned by an affiliation of the Lackawanna Steel Co., the Ellsworth Collieries Co., have been striking in violation of the resolutions of the union as voted at the Indianapolis convention. The company has its mines near an arbitrary line drawn by the union and operators and supposed to separate the thick from the thin coal in the Pittsburgh bed. The line makes no pretension of being a close index of coal thickness, and the ruling is that all coal opened north of the line is in the thin vein and all coal opened south of it is a part of thick-vein territory—the emphasis being on the word "opened." A shaft on the north side of the line confers on all the coal which is hoisted in it the quality of "thinness," even though it is mined south of the line.

Ellsworth Collieries Co. Locks Out Miners

Looking at the map in "Coal Age," Vol. 1, p. 36, it will be noticed that all the mines of the Ellsworth Collieries Co. and Acme 1 and 2 of the Pittsburgh-Westmoreland Coal Co. are south of this important line of division, as well as the mines of the Pittsburgh-Buffalo Coal Co. The miners of the Ellsworth Collieries Co. are anxious to be included in the thin-vein district and are desirous of receiving the thin-vein price, and they appear to have hoped that this readjustment would receive consideration from the scale makers.

It will be remembered that on Feb. 1 the H. C. Frick Coke Co. increased wages about 8 per cent. This was reported as a 10 per cent. increase. The Ellsworth Collieries Co. at that time voluntarily conceded an increase of the higher percentage, which later proved not to be as much of an increase as the machine miners of the region received 10 weeks later in conference at the McAlpin Hotel, New York City. But the company showed its excellent intentions and undoubtedly, as it is running a union mine, it is now prepared to pay a rate in line with the McAlpin agreement.

It does not, however, view with approval any attempt to make it pay the additional 5.69c., which is the differential formerly existing between the thick- and thin-vein regions. The area to the north is called the "third-pool field" because it lies between locks 3 and 4 on the Monongahela River, and the demand of the miners is stated as being for the "third-pool wage scale."

There has been more or less trouble since Apr. 1, when the new scale was to become operative, and on Apr. 8 there was a meeting of the Ellsworth and Cokeburg miners, which President Van Bittner, of district No. 5 attended. As a result of that meeting the company decided to close the mines down and shut the men out indefinitely. The Acme mines of the Pittsburgh-Westmoreland Coal Co., at Bentleyville, were closed by a strike, but they resumed work on Apr. 17, the miners not receiving their demands.

The Ellsworth companies are fully justified in their lock-out. They are doubtless willing to stand by the increases provided in the McAlpin agreement. Looking that instrument over carefully, however, as reported in full on page 502 of "Coal Age," no reference will be found to the thick-vein coal, although the thin vein is frequently mentioned.

Of course Hazel Kirk and the mines near the mouth of Pigeon Creek, which are in the thin-vein district, did not remain idle long after Apr. 1. The Clyde and Fredericktown mines and Vesta No. 4 in California, which are in the thick-vein region but on the Monongahela River, not on Pigeon Creek, were also idle for a few days. The Crescent mine at California has been idle now for two months.

Nonunion Miners Strike for Recognition

In several nonunion sections there has been much disaffection. Thus 38 mines were closed down by strikes in the Allegheny and Kiskiminetas valleys and the vicinity. As a result, 8,000 miners were idle, and mills and furnaces anticipated that they might be obliged to close down also. The miners want an 8-hr. working day, recognition of the union and a joint conference with the operators. The Ford Collieries Co., which is one of the largest of the companies affected, speedily signed the agreement to recognize the union and concede the 8-hr. day. The Bessemer Coal and Coke Co., of Curtisville, made a similar concession.

The strike has been recognized officially by the United Mine Workers of America through Van Bittner, the president of the district. The mines tied up are located at Cheswick, Valley Camp, New Kensington, Creighton, Hites and Leechburg.

The operators have been disposed to grant the demands of the strikers because business is so brisk that they do not like to face a long suspension. It is likely that in western Pennsylvania the union will make large gains this year. The success in increasing wages 5.39c. per ton, or about 12 per cent., will tell in its favor.

Still Apart in Hocking Valley

The meetings of the joint scale committee of operators and miners in the Hocking Valley, which convened at Logan, Ohio, on Apr. 10, adjourned on Apr. 14, until Apr. 17, without accomplishing anything of note. The first part of last week was spent in naming the subcommittees and in organizing.

The operators' representatives on the committee are J. M. Roan, representing the Sunday Creek-Continental interests; F. S. Knox, representing the New Pittsburgh Coal Co.; L. D. Poston, the Poston Consolidated Coal Co.; James Allen, the Cannelville Coal Co., and T. C. Morris, the New York Coal Co.

Demands were submitted by both the miners and operators. Opposite sides have been taken on a number of issues. There is no dispute on the question of advancing the day wage 5 per cent., and all that remains is to figure out the exact wage under the new scale.

But strenuous objection was imposed against the demand of the operators that the eastern Ohio rule concerning strikes should be adopted. That rule provides for a fine of $1 per day per man who strikes illegally. Only one cause for a strike is exempted from this rule—when the operator refuses to pay on the regular payday without sufficient explanation. All other grievances must be settled by arbitration without a suspension of work. The rule has worked well in eastern Ohio, and the operators are insisting upon its adoption in the Hocking Valley region.

The operators also want more stringent rules concerning the loading of dirty coal. A better system of fines and docking for the loading of dirt is one of the demands of the operators. On the whole it appears that an agreement may be reached within a week or ten days.

Exemption from Military Service in Great Britain is frequently based on unusual features. Recently a novel application for exemption for an attested single man was made by some 350 of the miners so that he could continue to repair and overhaul their cycles. It was shown that the cycle repairer saved from 30 to 40 shifts per week, and so helped to get more coal than he would underground, although a skilled miner. Formerly miners were kept from the pit because of the breakdown of their machines, but since the cycle repairer was installed this had been obviated.

Editorials

Coal Strip-Pit Scale in Ohio

Unfortunately coal stripping in the bituminous regions is not carried on to the depth that will later be practiced, and in most cases, consequently, it is extremely successful. The profits have been large and the competition with rival methods of mining has been severe.

The companies which are equipped and obliged by conditions to extract coal by undermining methods are naturally somewhat antagonistic to a form of mining which can compete so strongly with them in the market. The miners who are made idle by the progress of surface mining are similarly displeased.

All kinds of complaints are made that strip-pit mining is spoiling land values despite the fact that the value of the coal obtained is far greater than the price for which the land would sell if the coal were not there.

If coal so shallow were mined by underground methods the fuel would only be recovered in part and the land above it would be irretrievably spoiled because it would be turned into a series of cave holes; it would be unsafe for any animal or man to travel over it and it would be drained of its natural moisture.

On the other hand the steam shovel by turning over the land in many cases will improve it and will cause its mineral values to be more available for plant life. Of course where the material is rocky such a result is not obtained.

Moreover the natural waters are not removed and the surface is made perfectly safe. Perhaps later it may be possible to arrange that a sufficient layer of nitrogenized soil is replaced on the top of excavated material so as to make the ground retain all the advantages of age with the rejuvenescence resulting from the deep ploughing of the steam shovel.

Unfortunately, as profits have been high, there has been a necessity to save the present situation for the miners and operators near the strip pits. They naturally look at the situation very close home. It is not safe to argue with them that deeper stripping will mean decreased profits for the strippers and will keep strip-pit miners from taking the business from subsurface workers.

The problem is a bitter one now and as a result the miners have been trying to secure such day wages for the strippers as will be high enough to curb the progress of the stripping industry in which wages would normally be quite low because in it laborers can engage efficiently without any knowledge of either mining or the English language. Consequently riots have arisen in Ohio, and at last a new scale has been signed which it is to be hoped is not high enough to put an end to the continued progress of the strip-pit industry, a form of mining which is showing steady growth.

This type of mining can be supervised; it can therefore be worked by day labor with advantage and the strip-pit operator can obtain the benefit of all the efforts he puts forth to secure efficiency. So there is rapid progress; larger and larger shovels are bought, and no one knows just how cheaply overburden may be removed after awhile or how many feet of earth will be excavated per ton of coal retrieved.

The owner of a coal property with sufficient capital, a genius for efficiency and an ability to captain his labor successfully can win out at strip-pit mining, whereas in the underground he is hampered on all sides. The wage scale fixes for the underground operator the price of extracting a ton of coal, and try as he will he cannot change it more than a few cents. But in strip-pit mining the wage scale can be offset by efficiency, larger equipment and better methods, and depth within reason seems so far not to mean greater cost, but only a resort to more intelligent methods.

Of course there is a limit to this meeting of needs by adroit mechanical scheming, and the cost of strip-pit mining will at last rise, owing to depth and hardness of measures, so that the cost of stripping will be little lower than that of removing the coal by underground mining methods. It will be a pity if an undue wage scale should make that limit of depth less profound than could be compassed with a more normal wage.

Tinkering with Wage Tariffs

It is interesting to note that in the Pittsburgh district the miners in the thick coal want thin-coal pay, and in central Illinois the thin-coal miners want their rate equalized with that in force in the thick coal, whereas in the central Pennsylvania district it was declared that this is unfair, that coal from 3 ft. to 3½ ft. should pay 3c. per ton more and coal 3 ft. or less should pay a further differential of 2c.

However, the central Pennsylvania protocol just signed does not make the changes suggested. It merely recognizes the fact that certain Bennetts Branch mines have a higher scale than that ordered for the rest of the region and it affirms that differential already long established.

The miners whipsaw on this subject of equality of price and equality of earning opportunity. They would raise the easily mined coal to a level with the coal which is difficult to mine on the ground that this equalizes both in the market and that the companies with the better coal can better afford to pay the higher price. Then they raise the thin-coal price to a higher figure because more labor is involved in extracting such coal. As a result of the whipsawing, trade shifts around from one section to another, and men are idle, while their homes depreciate in value. Such changes in scale are as unsettling as changes in the tariff, and no ideal arrangement is ever reached.

The trouble is that there is always much logic possible to justify either change, but it should not be forgotten that there is a more imperative logic which condemns tinkering with the wage tariff.

The justice which is regarded by the miners as ideal, and which by economic readjustments evicts families from rented homes and renders unsalable those they have

erected, is perhaps in accord with reason, but none the less cruel and unsatisfactory. When will the miner be satisfied to let the industry rest? Statesmen rightly claim that we disturb the country every four years when we elect a new President. Even more rightly it may be contended that the miners try to uproot the whole industry by scale modifications every two years.

With varying mind as to what is justice, why not let matters remain as they are? Communities mining low coal in Pennsylvania at a price roughly equal to the cost of extracting thick coal have a right to go on existing in the future as in the past. The thick-vein district in Illinois must not be handicapped unduly by equality of wage with the thin-vein district or it may not be able to overcome the difficulties arising from its greater remoteness from the market. It is certain that in Williamson and Franklin Counties, where the coal is thick and the rate lower, there has been no great amount of prosperity of late. A slight readjustment might do no harm, but past experience is against such changes, which too often bring much suffering in their train.

Certainly central Pennsylvania operators mining thin coal should not be penalized by an unequal increase in rate. They are barely able to keep working now. It is not excessive royalties, highly priced lands or big bond issues which keep them poor, for the Clearfield region knows nothing of such conditions. It is the difficult natural conditions which hamper them, and a readjustment in the wage scale unfavorable to these operators is surely to be reprobated, not alone because it is unjust to the operators but because it is inopportune for the mine worker.

Everyone must rejoice that the protocol which the scale committee has accepted does not provide for differentials which would have made work in the Clearfield district even more unremunerative and irregular than it has been in the past.

Lake Coal Season Prospects

There is certainly considerable conflict in the statements made by various observers as to prospects for iron ore and coal movement on the Great Lakes this season. Iron-ore interests have repeatedly asserted that the Lake fleet would be unable to bring down all the ore required, and if that were the case the prospects for coal shipments would be far from bright. The coal absolutely needed would probably be moved, but with the high freights incident to a positive shortage of shipping facilities there would be no disposition to accumulate any coal stocks at the head of the Lakes, and plans might be so restricted that even the coal absolutely needed would not be fully provided.

A study of the blast-furnace situation indicates that the higher of the estimates as to iron-ore requirements are altogether too high. It has been suggested, for instance, that the Lake fleet might be called upon to bring down 70,000,000 tons of iron ore this season. This it could not do, even though more than half the boats made the up trip without coal cargoes.

But 70,000,000 tons is altogether an excessive estimate for iron ore. The United States is now making pig iron at the rate of 40,000,000 tons a year, and the question is not whether the furnaces can do better, given the ore, but whether they can maintain the rate, seeing that from time to time stacks must go out for relining. Comparing Lake Superior iron-ore shipments and pig-iron production during the past five years, it develops that a 40,000,000 ton rate in pig iron would correspond with 59,000,000 tons of iron-ore movement down the Lakes, other things being equal. With the curtailment in iron-ore imports and the fact that producing districts outside the Lake Superior region cannot very largely increase their output, the requirements in Lake ore can hardly be much over 60,000,000 tons.

Such a tonnage the Lake fleet can probably handle, and still carry as much coal on return trips as may be desired. The tonnage of the Lake fleet has not lately been increased, it is true; for most of the small vessels, perhaps all that could get through the short locks of the Welland Canal, have gone out to the ocean, and a few large vessels have been lost. Past performance, however, has not been equal to the real capacity of the vessels, as the starts have usually been slow and the closings frequently early.

This week the Canadian Government started the car-ferry steamer "Algomah" as an ice breaker in the Soo River, and other vessels are breaking the ice in other channels, while all vessel owners are anxious to start their first trips at the earliest hour. The season's freight movement will undoubtedly be much larger, in proportion to vessel tonnage, than ever before. As a suggestion of the possibilities that lie in an early start and a late close, it may be noted that in 1913, the banner year for Lake ore movement, with a season total of 49,070,478 tons, the monthly movement, in the order of tonnage, was as follows: July, 8,204,416; June, 7,974,444; August, 7,677,601; May, 7,284,212; September, 7,258,413; October, 6,526,103; November, 3,270,958; April, 866,386; December, 18,545.

Some of the lean months, shown above, were undoubtedly leaner than necessary. As a matter of fact, although the 1913 total was greater than the movements in either 1912 or 1915, the tonnage in each of the months August, September, October and November was less in 1913 than in either 1912 or 1915.

It has been the rule rather than the exception for Lake coal shipments to fall below the tonnages predicted at the opening of a season, yet there is good reason for the prediction made by a well-posted observer that the Lake coal movement this year will be close to 32,000,000 tons. This would be between one-fourth and one-third larger than the average movement in the past three years.

As the steel industry expands and grows to the Northwest, its coal requirements, to be taken over the Lake route, are expanding. There is the United States Steel Corporation's new plant near Duluth, operated as the Minnesota Steel Co., which went into operation about the first of the year. The plant has 90 byproduct coke ovens, requiring close to 500,000 tons of coal a year, besides which there are fuel requirements for the steel works. The Inland Steel Co.'s requirements are estimated as high as a million tons a year. It has 96 byproduct ovens at present, and is building 44 more to provide for a third blast furnace under construction. For the steel industry to operate full in the next twelvemonth there will probably be required 2,000,000 to 3,000,000 tons more coal to be taken up the Lakes than in any previous season for this purpose.

Sociological Department

Some Adjuncts to Efficiency in Coal Mining

By Lucius Willard*

SYNOPSIS—Miners in the little town of Roslyn (population under 4,000) raise $6,000 to rebuild clubhouse. The Northwestern Improvement Co. contributes $4,000 additional. Unlike the former clubhouse, which in its decline catered solely to the officials, this new building extends a real, unquestioned welcome to all comers.

"The best soft coal in Washington" is said to be in the six-mile vein high up on the eastern slope of the Cascades. It belongs to the Northwestern Improvement Co., with its center at the town of Roslyn.

Every coal operator knows the necessity of protecting from unnecessary wear and depreciation whatever equipment or machinery of any sort is used in his business. The "N. W. I." has discovered by actual working experience that to extend this policy to the human factor is to increase the producing capacity of its plant and to reduce the possibilities that friction will hinder effectual operation and replace harmony by discontent and ill will.

Though machinery has supplanted the "hand" in many branches of industry and to a certain extent in coal-mining, the "hand" is still an absolute necessity, unless the coal is to remain where the great chemist Nature made and placed it—in the ground. This fact, the company decided, made it a matter of business economy to protect the "hand" from unnecessary wear and tear and avoidable depreciation, precisely as is done with other working equipment.

When B. F. Bush took the position of superintendent of the Northwestern Improvement Co., he saw that this loss could be reduced considerably by a plan for club life which would compensate for the enforced exile of the employees from cities and towns and would enrich somewhat the barren lives of these men, upon whose labors the complicated structure of Twentieth Century industry depends.

Mr. Bush organized a club and had a clubhouse built. He energized the institution with his own enthusiasm and genius for organization. As long as he remained it thrived, but it testified to the power of his personality by taking the down grade as soon as he left. The breath was about to depart from the club when the Industrial Young Men's Christian Association was called upon to aid in the work of resuscitation.

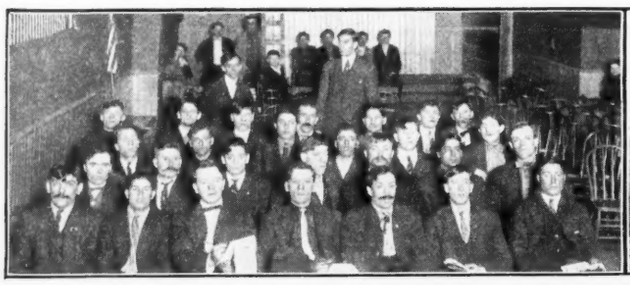
The coal operator who yearly sends his check to the Y. M. C. A. of his home city and lets his knowledge of the association stop there has usually little grasp of the work of the industrial branch. It might be described as the "secular arm" of the association, since its work has to do with all the practical and commonplace activities of human life in the logging camp, the mines, the irrigation projects and on the railroads.

A young and energetic general secretary of the industrial department of the Y. M. C. A. was put in charge of the club. He found a convenient, roomy clubhouse with athletic, recreational and other facilities for the physical and mental well-being of the members. One obstacle which lay in the secretary's path, however, had grown up during the temporary decadence of the club. He found that those who had been enjoying most thoroughly the advantages of the organization were those who perhaps needed them least—men known to the miners as "the white-collared bunch." Quite a line of cleavage was forming which would have been fatal to the best interests of the club and contrary to the moving spirit of an industrial Y. M. C. A., which is absolute equality for all its members.

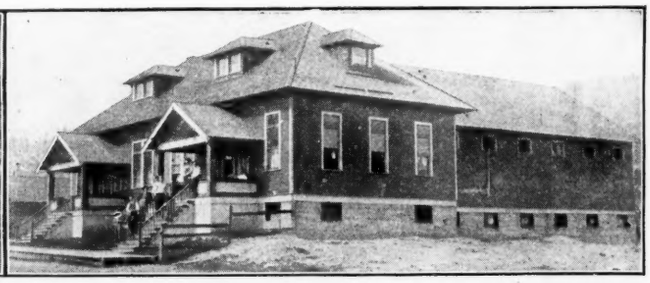
To the credit of the general secretary placed in charge of the Roslyn Y. M. C. A. it can be said that the good leaven of democracy soon leavened the whole lump and the "white collared" fears of the miners were entirely removed. These secretaries dress much like the men they

LIKE TOO MANY OF OUR MINING BUILDINGS, THE NORTHWESTERN IMPROVEMENT CO.'S CLUB AT ROSLYN, NOW REPLACED, WAS A PLAIN BARN-LIKE STRUCTURE

*Del Monte Apartments, Portland, Ore.



FOREIGN-BORN MINERS IN ATTENDANCE AT NIGHT SCHOOL AT ROSLYN Y. M. C. A.



A MORE HOMELIKE INSTITUTION REPLACES THE OLD BARRACK-LIKE BUILDING

serve and radiate an atmosphere of understanding and fraternal good feeling which cannot be mistaken.

One breezy October night about three years ago the clubhouse took fire and burned almost entirely down, so that it had to be rebuilt if the men were to continue their associated activities.

The company had invested $4,000 in the club property. To meet this unexpected contingency, they agreed to turn that amount over to the employees if they would raise the amount to $10,000. In ten days this was done. Just a year from the day the old clubhouse went up in smoke, the roomy, complete new clubhouse was opened for use, which is fair enough proof that the men liked their club.

The accompanying illustration shows the good lines and ample space of the new building. It is situated in the little coal town of Roslyn, where it is a blessing, not only to the men who work in the mines, but to their wives and children, and to the entire community as well. If a short study were made of the activities that go on within these four walls it would reveal how rich in human-welfare possibilities they are. The gymnasium activities for one year included gymnasium classes for business men, seniors, juniors and ladies; group games for each; basketball (seven teams practicing once or twice a week); wrestling exhibitions; boxing; athletic tests; indoor baseball (regular and Swedish); recreation nights, games, "Skin the Snake," etc.; basketball night.

The association stands for clean, square sport. These games and contests had the interest of the entire community and the active participation of many. It is easy to see what a wholesome, energizing effect they must exert upon the town.

The clubhouse is also the center for social gatherings, to which come not only the members of the club but nonmembers, men, women and children. Lecturers upon topics of general interest are engaged by the committee in charge of the lyceum department. Another phase of work is the finding of employment for those who need it. This is done by the secretary, in communication with mining men and with engineers in the reclamation service. There is a library in the clubhouse of 1,500 volumes—history, travel, technical subjects, matter suited to children, fiction, etc.—with about 500 borrowers in the town of Roslyn. A long line of these can be seen every day during hours of delivery. It is the only public library in the town and so fills a need not only of the miners but of the whole community.

THE "MELTING POT" AT WORK AT ROSLYN, WASH., CONVERTING CHILDREN OF 23 NATIONALITIES INTO AMERICAN CITIZENS

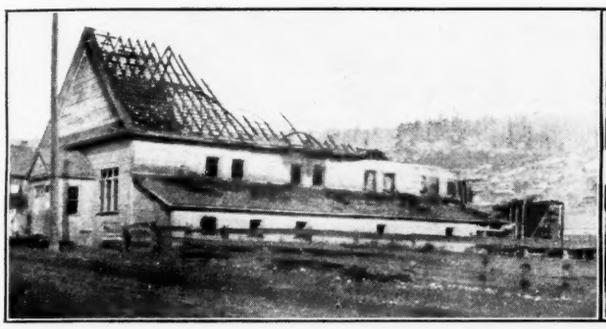
1, Italian; 2, American; 3, Austrian; 4, Polish; 5, Scotch; 6, Welsh; 7, French; 8, Lithuanian; 9, Hungarian; 10, German; 11, Montenegrin; 12, Slav; 13, Russian; 14, Norwegian; 15, Finn; 16, Syrian; 17, Czech; 18, Negro; 19, Swiss; 20, Irish; 21, English; 22, Dutch; 23, Norwegian; 24, Swede; 25, Bohemian

Of especial interest to the coal operator is the fact that these employees are taught intelligent safety-first methods. Hundreds are reading the books about "Mine Accidents and Their Prevention," while the raising of their physical efficiency, the quickening of their mental capacity, through athletic exercise, games of skill and opportunity for thorough, comfortable bathing, make them better, more dependable employees.

Over and above all this is the care taken of and the education given to the immigrant. The illustration shows children of 25 different nationalities who are receiving a welcome at the Roslyn Industrial Y. M. C. A. Think what it will mean to these little wanderers from other lands to have the books, the games, the teaching, the social life this club gives them, and think what it means to the country at large to have them by this means becoming useful and happy citizens of their adopted country.

It would hardly be possible for an enterprising coal operator to investigate the miners' Industrial Y. M. C. A. of the Northwestern Investment Co. at Roslyn without feeling that his own people would be benefited by such an association and his own prosperity enhanced.

The Northwestern work of the association is in charge of John A. Goodell, international industrial secretary, with headquarters at 306 Y. M. C. A., Portland, Ore.



ALL THAT WAS LEFT OF THE CLUB AFTER THE FIRE HAD SWEPT OVER IT

HOW THE MINE WORKERS, OLD AND YOUNG, WORKED TO REPLACE THE BURNED BUILDING

First-Aid Meet, Clinton, Ind.

The Indiana miners are such enthusiastic advocates of first-aid that they do not wait for fair skies and the open field, but crowd into a hall in the rain and hold their matches. Nothing seems to dampen their interest in this newest of sports, which combines help with pleasure and philanthropy with joy of competition.

A celebration was held in honor of the establishment of the 8-hr. day in the bituminous fields on the day dedicated to that principle, Apr. 1, and the crowning event of the festal occasion was a first-aid contest. It was held in the Dies Hall, of Clinton, Ind., commencing at 2 p.m. and lasted till near midnight, except for an intermission at the hour for supper.

The Bunsen Coal Co. No. 4 team, George McNair, captain, took first prize of 6 gold medals, to which were added 6 special bronze medals donated by the National Safety Council and a lot in the village of Universal. The score was 95 per cent.

The Clinton Coal Co.'s No. 1 team, W. Burton, captain, was only a tenth of a point behind, and though much deserving, only succeeded in obtaining second place, 6 silver medals and 6 boxes of cigars. The Miami Coal Co. No. 4 team, Ed Lapworth, captain, made a score of 94.5, only four-tenths of a point less than the Clinton Coal Co. To their credit fell 6 bronze medals and 6 boxes of cigars. The fourth team was that of the Bunsen Coal Co. No. 5, with a rating of 94.3.

The other contestants secured place and points as follows: (5) Miami Coal Co., No. 2, 92.9 points; (6) Jackson Hill, No. 1, 92.4 points; (7) Clinton Coal Co., No. 2, 91.9 points; (8) Dearing Coal Co., No. 8, 91.2 points; (9) Miami Coal Co., No. 3, 90 points; (10) Miami Coal Co., No. 1, 90 points; (11) Jacksonville, No. 1, 86.5 points; (12) Jacksonville, No. 2, 84.4 points; (13) Clinton High School, 83.3 points; (14) Clinton Grade School, 80.3 points.

The girls' team, which took part in only six events, scored 89.3 per cent., and thus would have ranked eleventh had they been in competition with the rest. Each received a dress and a broom. The team which took ninth place consisted of trapper boys. They tied with Miami Coal Co. No. 1 team, and a further contest was needed to determine their rightful place.

Dr. W. A. Lynott, mine surgeon of the Bureau of Mines, was the chief judge and was assisted by several Terre Haute doctors. Each of the ten events was written up so as to visualize a scene in which somebody had violated a rule of safety and thus it brought home to everyone what opportunities there were to make such first aid unnecessary.

Thus event No. 7 reads:

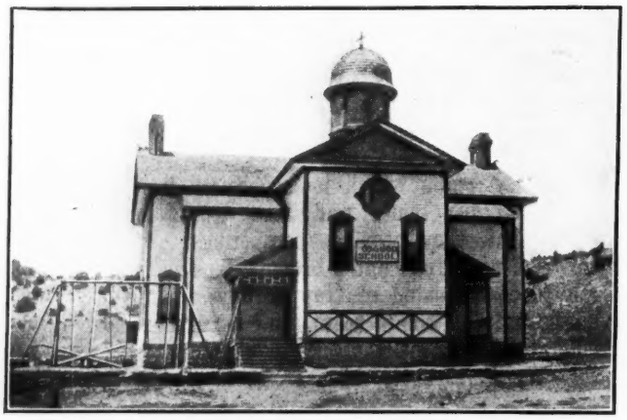
Miner having left shot, goes out and then returns for a dull pick. While in the room the shot goes off, and the man sustains a simple fracture of the right side 4 in. below the hip, a severe laceration in the center of the upper hip and of the right ear. Treat and carry 30 ft. on a stretcher.

This plan is quite usual in the Middle West, and the idea is worthy of imitation elsewhere. The event provides an admonition in safety as well as a problem in first aid.

Supper was provided for the contestants, but the general public supped at home. In the evening a meeting was held with Dr. August F. Knoefel, of the National Safety Council, in the chair. The speakers included City Attorney Mark W. Lyday, representing the town of Clinton; Robert Smith, of West Terre Haute, representing the operators; Dr. Lynott, representing the Federal Bureau of Mines; Dr. Worrel, an eye specialist of Terre Haute; W. D. Ryan, of the Bureau of Mines, and Charles Fox, of the state bureau of mine inspection.

High Schools To Be Started in Colorado Villages

High-school education is to be provided for miners' children in Colorado Fuel and Iron Co. villages. Confronted by the problem of making provision for children who had finished the common-school course and were ready for high school, but whose parents in many cases were unable to send them away from home, the company has decided to take the high school into the mine villages.



OSGOOD SCHOOL AT ROUSE, COLO.

This decision was reached at a conference held at Trinidad on Mar. 17. The meeting was called on the initiative of the joint committee on recreation and education in the Trinidad district provided under the industrial representation plan put into effect by the company and its employees following the visit to Colorado last fall of John D. Rockefeller, Jr. The conference was attended by members of the school boards having charge of the schools in Colorado Fuel and Iron Co. villages located in Las Animas County. Officers of the company and County Superintendent Floyd, of Las Animas County, also were present and gave their hearty approval and support to the project.

Discussion brought out the fact that at most of the company's villages there are miners' children who had finished the eighth grade work provided in the common schools. Most of these children are eager for more education. In some of the villages efforts are made to send them to the nearest large town, thus entailing considerable expense and often separating the children from their parents from week-end to week-end. At one camp—Rouse, in Huerfano County—the experiment has been tried of extending the school course to cover the first two years of the high school.

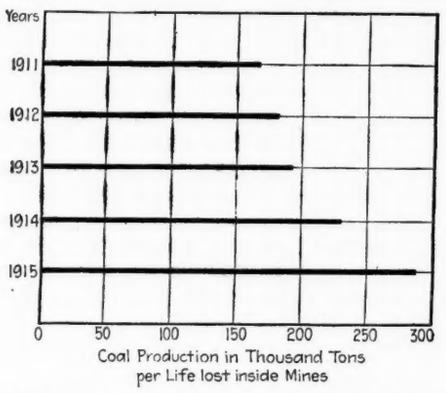
After considerable discussion the conference voted to recommend to each school board in Colorado Fuel and Iron Co. villages in Las Animas County that ninth and tenth grade instruction be provided. This covers the first two years of a high-school course. Some closely adjoining villages probably will combine for their high-school work. Where this is not possible each mining town will have its own school. It is likely that several new buildings or additions to the present schools will be erected, and additional and higher paid teachers will be employed.

SCHOOL CHILDREN AT THE CAMERON VILLAGE

At the conference, C. J. Hicks, executive assistant to President J. F. Welborn, told the assembled school directors that the Colorado Fuel and Iron Co., which in most cases will have to bear practically all the expense from additional taxation, is heartily in favor of the junior high-school plan and will gladly bear its share of the cost.

Do the Night Schools Pay?

The Nanticoke, Penn., School District, in announcing the closing exercises of the evening vocational classes held last Wednesday, Apr. 12, in the High School Auditorium, called attention to the fact that of the 68 students who had taken and passed the state examination for mine foreman from 1913 to 1915 inclusive, 43 were already



WALSH'S CHART SHOWING RELATION BETWEEN EDUCATION AND SAFETY

in better-paying positions. The earnings of the students prior to examination were $33,760, and in the year ending April, 1916, they earned $47,530, an increase of $13,770, or 40 per cent.

The Nanticoke District Mining Institute also is giving circulation to a chart, compiled by J. J. Walsh, state inspector, and here reproduced, showing the decrease in the death rate of the Tenth Anthracite District since 1911 as an evidence of the value of education as a means of reducing fatalities.

Mine Foreman's Walking Stick—This has been used from time immemorial to measure the thickness of coal and test the roof. M. H. Fies in addressing the Alabama Coal Operators' Association said: "Isn't it entirely practical for the safety boss and the mine foreman to carry a gage instead of the proverbial hickory walking stick. If the walking cane must persist in being the emblem of practicality and the badge of authority, why not make it serve a double purpose by cutting two gage notches in it? I know of no better resolutions that foremen can make than that they will stop walking by bad track in the hope of remembering to send the trackmen to it and will make a practice of more frequently gaging supposedly good track. Accidents due to bad tram roads are avoidable. Why not avoid them?"

Safety from Trolley Accidents in Coal Mines—A. F. Elliott suggested the following rules to the Alabama Coal Operators' Association for safeguarding 250-volt trolley wires: (1) All trolley wire should be strung on the opposite side of the entry to that on which the rooms are turned so that men will not have to pass under the wire when entering their places. (2) Where wires cannot be so placed, the wire must be shielded opposite the room to prevent men from touching it with tools or when lifting cars onto the track. (3) Where there is much traffic, wires must be shielded. (4) Electric locomotives should have two trolley poles, and these should be so arranged that both cannot be made alive at the same time. (5) Water must be drained from haulage roads. (6) Roof must be shot to required height for trolley wires. (7) Employees must use shoes at all times when in the mine.

Discussion by Readers

The Curse in a Dead Man's Eye

Letter No. 1—In reading *Coal Age,* my attention has twice been arrested recently by the reference made to "the curse in a dead man's eye." The first reference appeared in "Extracts from a Superintendent's Diary," *Coal Age,* Feb. 5, p. 252, and the second was made by the writer of Letter No. 30 when speaking of the responsibilities of mine foremen, Mar. 11, p. 469.

I thought it would be of interest, at least to those of literary inclination and perhaps to others, to know that this quotation is taken from Coleridge's "Rime of the Ancient Mariner," part IV, lines 33-36, which read as follows:

> An orphan's curse would drag to hell
> A spirit from on high,
> But oh! more horrible than that
> Is the curse in a dead man's eye.

There is here much food for thought that will no doubt suggest further discussion, by arousing memories of sad experiences that might have been avoided had more time been spent in sober thought and reflection on the possible consequences of reckless acts that resulted in disaster. D. M. L.

New York City.

Efficient Mine Foremen

Letter No. 34—In going over my past experience in life and reflecting on the efforts of every mine official to be more progressive, I find that one must be efficient before he can become progressive. Coal operators do not need men who are inefficient.

I recall the time when I started as a trapper boy in the mines 24 years ago. Since then I have filled almost every position in mining work. I did this from a desire to make myself efficient in every branch of the work, knowing that this would assist me in rising to a better position, and would at the same time benefit my employer.

Speaking of efficiency I would say that a mine foreman may be strictly honest in all his dealings with his employer and with the men in his charge. While he must watch every cent of outlay, he must also see that full time is given each man for the work he has performed. He must faithfully fulfill all his obligations and promises in order that he may retain the respect and confidence of his men. A mine foreman must not fail to make improvements in ventilation, drainage and haulage whenever he believes the outlay will bring good returns. In the daily operation of the mine he must keep his eye constantly on every detail relating to the safety of the men. He must be quick to observe the first indication of danger at the working face and must instruct all workmen in regard to the necessity of caring for themselves and others.

An efficient mine foreman is a good organizer. He has the knack of putting the right man in the right place. It is no small task to match men, as they must usually work together. It requires the exercise of the best judgment on the part of the foreman. To succeed well in controlling the men and avoiding the many troubles that arise in mines, a foreman must have a mild temper and a winning way that will draw men to him and make them his friends. By doing so he will often be able to avoid a local strike. A foreman must understand his superintendent, learn his nature so as to interpret his ways and manner, which will often avert trouble arising from misunderstanding each other. There should be perfect harmony between a superintendent and his foreman.

I am glad to say that in our mines the superintendent requires every foreman to maintain a strict discipline, and he coöperates with them to secure this end. He visits the mine almost every week and goes over the work with the foreman and his assistants. In some cases the foreman will take one district of the mine in the morning, his assistant taking the other district, and in the afternoon they will change, each taking the other's district. By this means the foreman is able to keep in close touch with all the work and the safety of the men employed. Sometimes the foreman and his assistant will go together.

If the same judgment was exercised by all superintendents and if they would not try to work the life out of the inside officials, as they often do, better results would be accomplished. When the foreman and his assistants are overworked, many things will frequently escape their notice, because they have not the time to make a close observation of each working place. The necessary supplies are often not on hand, and other important details are overlooked or forgotten. Such a condition not only acts as a sprag to the output of the mine, but blinds the eye of the foreman to the safety of persons in his charge.

In closing, permit me to say that efficiency is merely the exercise of common sense on the part of mine officials, which leads them to coöperate with each other, thereby producing greater economy and increasing the output of the mine. JOHN BUGGY.

Chambersville, Penn.

The Miner and "Safety First"

Letter No. 8—"Safety First" is the slogan in many mines, and it is a very proper one—a good motto for every miner to adopt. There are numerous other mottoes equally as good. For example: "We expect all our employees to help us make this mine safe;" "Stop, look and listen;" "This wire is charged;" "Beware of the trip;" "Shut this door behind you;" "Let every man try the roof in his place before starting to work and after firing a shot."

The following notice is often seen posted in mines, or one to a similar effect: "All persons are cautioned not to go into any old or abandoned workings, rooms or entries, unless authorized by the mine foreman or his assistant to do so, and he must then be accompanied by

another person. Any violation of this rule is liable to result in loss of life and property."

These rules and instructions are suggested by sound common-sense. I know of mines where all of the foregoing signs and more are posted throughout the mine, but the miners fail to live up to the rules and regulations, which are broken every day so many times that they have come to be regarded as a dead letter by most of the men.

Again, there are mines where the men are allowed to wander about from place to place and ramble at will wherever they please, and no attempt is made to stop them. In some instances live wires are grounded at different points in the mine, and no effort is made to safeguard such places. In one particular mine where the ventilation is very poor the air is not conducted to the working face, brattices and doors are broken down, and everything seems to be about six months behind the times. The miners are permitted to employ reckless methods of mining their coal. Indeed, it may be said that the management of that mine have a hobby for creating danger instead of trying to promote safety.

In other cases that I could mention there is a great waste of material sent into the mines. Many of the props are unfit to stand, being too small or crooked or having dry rot. In some places the men are working 300 ft. ahead of the air, because doors that should have been put in six months before are still wanting. Hundreds of props lie buried in the gob, and hundreds of feet of tracking, both wood and iron rails, left in abandoned rooms and entries, have been covered by falls and lost. What can be expected of a mine where such conditions have been permitted to exist for years. Is it strange that many men have lost their lives in those mines, simply because of a lack of discipline and system on the part of the management?

All that I have said describes truthfully the condition in one large mine, which is only one instance of many. Although this particular mine was placarded from one end to the other with safety signs and notices such as I have mentioned, the miners continued to do as they pleased. There was no discipline, because the superintendent, for fear of losing some of his men, would not permit the mine foreman to enforce the rules and regulations that were posted so prominently. The condition is much aggravated because there are many mine foremen and superintendents who stand ready to hire the men discharged from another mine for violation of safety rules. In the matter of blasting coal in some mines, the miners are permitted to shoot off the solid and at any old time when they are ready.

Some time ago I was in charge of a large mine that was very dry and dusty. It was necessary for me to maintain discipline, and to do this I was compelled to discharge many men who persisted in violating safety rules. For a long time previous the mine had been permitted to run down. I remember calling the attention of the assistant mine foreman to an accumulation of 8 or 10 tons of fine coal dust that I found in one place, when he remarked that, "That is nothing; other places are in much the same condition." This mine also was placarded from one end to the other with safety signs and notices.

In my experience I have known instances where it might be truthfully said: "Woe betide the man who would attempt to introduce any radical reform in the mine. He would promptly lose his official head for such an attempt." Let me ask, Where are we to look for safety first in the operation of a mine under such conditions? The first duty of a soldier is obedience, and the first duty of a miner is expressed in the words "safety first." He owes it to himself and his fellow workmen and to his wife and family, if he is married. Let mine foremen do their duty as men and spend their time in the mine, not merely going in to measure up yardage or dead work when this is required, but giving their whole attention to the instruction of their miners and seeing that they do not practice any bad habits in the shooting and mining of their coal, or knock out a timber to permit a machine to pass and fail to reset the post.

There are many things that demand the mine foreman's constant attention if he would improve the safety of the mine in his charge and reduce the accident list. It has been my good fortune that, during an experience of 18 or 20 years, I have had but one man killed by a fall of rock. It has always been my custom when a man was discovered doing something that was not right to instruct him in the proper way to perform the work. If my instructions were then disregarded, the man would be disciplined, and if that did not cure him of the practice, he would be dismissed. Dismissing a man does not come easy at first, but the miners soon come to understand that the mine foreman who is firm and reasonable is working for their best interest and welfare and they will come to respect him. I consider that the dismissal of a constant wrongdoer is one of the best safety-first ideas that can be put in practice in a mine.

In closing, permit me to say that if mine managers would support the superintendent, and the superintendent back up the mine foreman in enforcing the safety rules in a mine, regardless of whether or not a few men quit on that account, safety-first efforts and work will be more effective. AN OLD WAR HORSE.

Rock Forge, W. Va.

Waste of Material in Mines

Letter No. 3—The question of supply and waste of mine material is worthy of careful consideration, having as it does a direct bearing on the cost of production of the coal as well as the successful operation of a mine. The waste of material in some mines may be small at first, but if permitted to continue will grow and soon become an expensive item.

Someone has said, "It is the small items that aggregate big things." This is especially true when applied to the operation of an extensive coal mine. In different mines the items of expense and cost for supplies differ widely. Some mines, having their timber and sawmills convenient, saw their own ties, caps, boards and other material and in this way get their supplies at first cost, while at other mines not so favorably situated the timbers must be hauled long distances and other material purchased in the market at an advanced cost. Consequently, what would be considered expensive waste in the latter mine would not be so considered in the former.

Many employees of mines will drift into wasteful habits if permitted to do so. Trackmen will soon get to think that they cannnot use a tie or spike the second time,

when in many instances these would answer every purpose as well as new ones, to say nothing of the saving effected in time and expense. In my experience as a miner and mine inspector I have observed almost enough material going to waste in some mines to have supplied another mine of the same size. Moreover, this liberal supply of material did not in any way increase the output or decrease the labor expense; but the general operating expenses were necessarily much increased. I have also observed a few mines operated at the other extreme, where the needed supplies were not furnished, because of a wrong idea of economy on the part of an inefficient management, and where the added cost of such supplies would have materially reduced the cost of putting out the coal.

For example, I have seen cars pulled on the ground and through mud for lack of material to make a track. No sober man will claim that such work means economy and good management. Drivers cannot bring coal to the sidings without track being laid. It is necessary to first supply the means to get the coal and the track on which to haul it, and then drivers can be expected and required to deliver it. Miners being compelled to leave their working places for want of material to build a door or brattice to get air when the company needs their coal is poor economy. In fact it is generally more expensive in the end to withhold such supplies than to furnish them when first needed. Again, to allow miners to suffer for air for lack of a door or brattice, to the extent that they can do only half a day's work and perform that at a great disadvantage, while plenty of material is going to waste nearby and the bratticeman is sitting on the siding waiting for new material which he has ordered from the outside, is an expensive waste, but one that is frequently observed in too many mines.

Miner, in his letter No. 16, Jan. 1, p.. 24, writing in regard to "Efficient Mine Foremen," attributes the waste of mine supplies largely to the inefficiency of the foreman and his assistants. I agree with him in this conclusion. No one on the outside knows as well as the foreman what kind and how many supplies are really needed on the inside work. He is on the ground and has an opportunity to know the true situation, and he can forbid the ordering of new material and the letting of material go to waste that can be used again. It appears to me that no one is more responsible than the foreman for the great waste of material that is steadily going on in some mines. It is every mine foreman's duty, in the interest of his employer, to see that all mine supplies sent in are judiciously used and none permitted to go to waste. Letter No. 1, Jan. 29, p. 217, by "Incog," gives a good illustration of how material is many times wasted in coal mines.

It is well to keep an accurate outside account of all material and supplies sent into the mine, but unless these supplies are closely watched by someone on the inside, such an accounting will not keep tracking from being covered up and lost by heavy roof falls, because it has not been removed in time from rooms that are finished. Neither will it keep unused water pipe from being eaten by rust, nor boards, timbers and other material that coud be used again from rotting here and there throughout the mine. JOHN ROSE.

Dayton, Tenn.

Locating a Booster Fan

Letter No. 4—I have just read Frank Kain, Jr.'s, letter No. 1, *Coal Age*, Apr. 8, p. 646, entitled "Locating a Booster Fan," and in accepting the invitation given in the appended footnote to discuss this matter further, will say that I do not know where Mr. Kain gets his rule for determining the capacity of two fans working tandem or in series. I believe he would have difficulty in deriving such a rule.

In a proposition of this kind the results obtained will depend not only on the theory of air flow, but equally as much on the characteristics of the particular fans under discussion. If the fan in question is one of the recent multiblade or turbine type, we can safely assume that the pressure or water gage will be practically constant, within slight ranges of capacity, at a given speed. On this assumption, then, it is easily seen that two fans of equal dimensions, working in series at the same speed, will give a combined pressure or water gage double what would be given by one fan working alone.

Then, assuming that one fan of this type will handle, say 30,000 cu.ft. of air per min. at ½-in. water gage, two such fans working in series should double that gage. And as the capacity of a mine for passing air varies as the square root of the water gage, it is easily seen that when the water gage is doubled, the quantity of air circulated will be increased in the ratio of the square root of 2; or in this case, the circulation produced by the two fans working in series and each having a capacity of 30,000 cu.ft. per min. at ½-in. water gage would be $30{,}000\sqrt{2} = 30{,}000 \times 1.41 = 42{,}300$ cu.ft. per min. instead of 38,000 cu.ft., as calculated by Mr. Kain.

Peculiarities of Disk Fans

In the particular case that prompted this discussion, however, a disk fan was used, and it happens that the characteristics of this type of fan are at marked variance with the turbine type mentioned. With a disk fan operated at constant speed, an increase in capacity is marked by a drop in the pressure or water gage that the fan will produce. On this account, with the use of a disk fan under the assumed conditions, no such increase in capacity can be obtained as would be expected in a fan of the turbine type. It may be stated that two disk fans of equal dimensions, operated in series at constant speed, would yield about 13 per cent. increase in capacity and approximately 28 per cent. increase in water gage over what one of these fans would produce when operated at the same speed alone. In order to double the water gage, in this case, it would be necessary to increase the speed of both fans.

My calculations on one type of fan show that to obtain the quantity of air mentioned (42,300 cu.ft. per min.), the speed of the two fans would have to be increased about 28 per cent., and the water gage would then be doubled. This would require an increase of about 72 per cent. in the power required to drive each fan—partly due to the fact that a larger quantity of air is handled at an increased speed and partly because of a greater velocity of the air passing through the fan, thus creating a higher velocity head and resulting in a loss of efficiency in the fan. The figures I have given apply of course to the particular size and type of fan on which my calculations

are based. They would probably have to be altered to suit other sizes or makes of fans having different characteristics, but they serve, by way of comparison, to illustrate the points mentioned.

For the sake of illustration, let us assume a mine ventilated in three splits whose lengths are in the ratio of 2 : 1½ : 1. Then, with a fan handling 30,000 cu.ft. per min., the natural division of the air is as follows: Split 1, 8,400 cu.ft.; split 2, 9,700 cu.ft.; split 3, 11,900 cu.ft. The quantity of air passing in each split, as given above, is calculated by the general formula:

$$q_1 = \frac{Q\sqrt{l_2 l_3}}{\sqrt{l_1 l_2} + \sqrt{l_1 l_3} + \sqrt{l_2 l_3}}$$

Taking $Q = 30{,}000$, and for the several splits, $l_1 = 2$, $l_2 = 1.5$, $l_3 = 1$, we have, for the quantities passing in each split, as follows:

Split No. 1,

$$q_1 = \frac{30{,}000\sqrt{1.5}}{\sqrt{2 \times 1.5} + \sqrt{2} + \sqrt{1.5}} = 8{,}400\ cu.ft.$$

Split No. 2,

$$q_2 = \frac{30{,}000\sqrt{2}}{\sqrt{1.5 \times 2} + \sqrt{1.5} + \sqrt{2}} = 9{,}700\ cu.ft.$$

Split No. 3,

$$q_3 = \frac{30{,}000\sqrt{2 \times 1.5}}{\sqrt{2} + \sqrt{1.5} + \sqrt{2 \times 1.5}} = 11{,}900\ cu.ft.$$

Suppose, now it is desired to bring the capacity of No. 1 split, which is the longest of these three splits of air, up to the capacity of No. 3 split, which is the shortest. To increase the quantity of air in No. 1 split from 8,400 to 11,900 cu.ft. per min. would increase the water gage in proportion to the square of the quantity ratio, or $(11{,}900/8{,}400)^2 = 2$. In other words, the water gage required to produce this circulation in split No. 1 must be doubled. In the same way, to increase the circulation in split No. 2 from 9,700 to 11,900 cu.ft. would require an increase in water gage in the ratio $(11{,}900/9{,}700)^2 = 1.5$. That is to say, the water gage in No. 2 split must be increased 50 per cent. Assuming that a ½-in. water gage produces the required circulation (11,900 cu.ft.) in No. 3 split, there will then be required a 1-in. water gage in split No. 1 and a ¾-in. water gage in split No. 2 to equalize the three splits.

Choice of Two Methods Suggested

Now, there are two ways of thus equalizing the circulation so that each split will pass 11,900 cu.ft of air.

1. The speed of the fan must first be increased so as to pass the required total quantity of air ($3 \times 11{,}900 = 35{,}700$ cu.ft.) under a 1-in. water gage. Regulators must then be placed in each of the shorter splits, Nos. 2 and 3, leaving split No. 1 open or free. And since No. 1 split formerly passed 8,400 cu.ft. under a ½-in. gage, it will now pass the required 11,900 cu.ft. under twice that gage; because $8{,}400\sqrt{2} = 8{,}400 \times 1.414 = 11{,}900$ cu.ft. per min.

The water gage, due to the regulator in split No. 2, is found by subtracting the natural water gage, or that due to friction, from the water gage produced by the fan (1 in.). The natural water gage varies as the square of the quantity of air in circulation, and is therefore ½ $(11{,}900/9{,}700)^2 = ¾$ in. The pressure due to the regulator in this split is, then, $1 - ¾ = ¼$ in. In split No. 3 the required circulation (11,900 cu.ft.) was produced by a natural pressure of ½ in., and the pressure due to the regulator in this split is therefore $1 - ½ = ½$ in.

Finally, in producing this entire circulation, we have a fan handling a total of 35,700 cu.ft. of air per minute against a 1-in. water gage, requiring under ordinary conditions of efficiency say 10 hp. applied to the fan shaft.

2. Another arrangement to equalize the circulation in these three splits, so that each split will pass the required quantity of air as before (11,900 cu.ft.), would be to use booster fans in Splits Nos. 1 and 2, while running the main fan at a speed to produce the required total quantity of air (35,700 cu.ft) under a ½-in. water gage.

In this case, Split No. 3 will pass the required quantity of air under its own natural pressure, which is the pressure due to the main fan. Split No. 1 will require a booster fan that will increase the water gage produced by the main fan (½ in.) so as to give a total of 1 in., which is the natural water gage required to produce 11,900 cu.ft. in this split.

Likewise, in Split No. 2 there will be required a booster fan that will increase the water gage due to the main fan (½ in.) to the natural water gage required to produce the same circulation in that split. In other words, the booster in this split must give a ¼-in. water gage, which added to the gage due to the main fan gives the ¾-in. gage required here.

As stated previously, the characteristic of the disk fans employed as boosters in this case is that as the quantity of air required is increased, the water gage drops. On this account, while both of the boosters in Splits Nos. 1 and 2 will be smaller fans than the main fan, the booster in Split No. 2 will require to be larger than the booster in Split No. 1, because it must produce the same quantity of air under a lower water gage.

In the last-mentioned arrangement, the combined horsepower of the main fan and the two boosters would be 8½ hp., or 20 per cent. less than would be required for a single fan at the higher water gage. The following table gives these figures in condensed form:

	Cu.Ft. Min.	W.G.	Size Fan	R.p.M.	Hp.
Main fan	35,700	½ in.	66 in.	400	5½
Booster No. 1 split	11,900	½ in.	38 in.	825	2
Booster No. 2 split	11,900	¼ in.	48 in.	425	1
Total					8½

The foregoing discussion is not intended to be construed as a recommendation, but is given as an analysis of certain assumed conditions. Many operators would prefer to use the single fan in spite of the slight saving in power which might be effected by employing boosters. The use of this type of fan, however, is so common nowadays, especially in drift mines and particularly in West Virginia fields where water gages are low, and in early development work in mines in other localities, that it seems a discussion of this nature is opportune and may be of profit.

One thing, however, is at once apparent; namely, the selection of the suitable size for a booster fan has no relation to the size of the main fan, but is dependent on the amount of air to be handled through the particular workings it is intended to ventilate and the increment in water gage which that particular split requires to produce the desired capacity.

W. A. Rowe,
District Sales Manager, American Blower Co.
Pittsburgh, Penn.

Inquiries of General Interest

Examinations in Illinois

Kindly answer the following questions: 1. What knowledge must a person have of coal mining, mathematics, geology, surveying and mining machinery before he can take the examination for fireboss or mine foreman, first or second grade, in Illinois? 2. How many years' experience in mining are required, and must a foreigner first obtain citizenship papers? G. F. Libiez.

Peru, Ill.

A mine foreman in Illinois is called "mine manager" and a fireboss, "mine examiner." Candidates for examination for the position of mine manager, first- or second-grade certificate, must be citizens of the United States, 24 years of age, with at least four years' practical mining experience. They must be men of good repute and temperate habits. The examination for first-grade certificate includes questions relating to experience in mines, management of men, knowledge of mine machinery and appliances, use of surveying and other instruments in use in mining, properties of mine gases, principles of ventilation, first-aid and mine-rescue work and appliances and knowledge of the mining law of the state. The second-grade examination includes questions relating to experience in the management of men, the knowledge of coal mining and mine ventilation and the mining laws.

Candidates for the position of mine examiner must be citizens of the United States, 21 years of age and of good repute and temperate habits, and have had at least four years' experience in practical mining. The examination questions relate to experience in mines generating dangerous gases, knowledge of nature and properties of firedamp, laws of ventilation and the structure and use of safety lamps. Also, a knowledge of the mining laws of the state is required.

Friction of Air in Mines

Upon what does the friction of air currents passing in mine airways depend, and how is it determined? Recently I came across the question, "How do you find the friction of air in mines from the barometer?" I would like to see this question answered in *Coal Age*.

Alberta, Canada. E. B.

What is described as "the friction of an air current passing through a mine or airway" is the resistance that such a mine or airway offers to the passage of the current. This resistance, as calculated, is expressed in pounds. It is caused by the friction of the air rubbing on the sides, top and bottom of the airways and striking against timbers and other projecting surfaces in the mines. The estimation of the friction of air currents, or the resistance, in mine ventilation, is based on the number of square feet of rubbing surface and the velocity of the air current.

The unit of resistance has been termed the "coefficient of friction," which is a misnomer inasmuch as it represents other resistances than that caused by friction. There are two coefficients in common use, namely, the Atkinson coefficient 0.0000000217, which has been abbreviated to 0.00000002, and the Fairley coefficient, 0.00000001. In the use of these coefficients much will depend on the character of the mine, size of opening and style of timbering employed. In mines where the airways are large and fairly straight and there is little timbering or other obstructions to the flow of the air current, the smaller Fairley coefficient will more closely represent the actual condition. But in airways of smaller sectional area or where timbers and other obstructions resist the flow of the air, the larger Atkinson coefficient is better applied.

These so-called coefficients of friction or units of resistance, represent the resistance offered to the flow of the air current per square foot of rubbing surface and a velocity of 1 ft. per min. Hence to obtain the total resistance it is necessary to multiply the unit resistance, or coefficient of friction, by the number of square feet of rubbing surface in the airway, and that product by the square of the velocity of the current. It is necessary to square the velocity because both the number of resisting particles and the blow given each particle vary directly as the velocity of the passing air current.

It will be readily seen that the friction of air currents in mines has nothing particularly to do with the barometer, although it is claimed that the density of the passing air, which varies with the barometric pressure, has a slight effect to increase the friction of the air in its passage through the mine. This effect, however, is so very slight that it can safely be ignored in calculating the resistance of an airway or mine.

Mathematics in a Shaft

It happened that a column pipe in a circular shaft 20 ft. in diameter became loose, and the upper end fell across the shaft, while the lower end of the pipe rested on the opposite side of the shaft. In this position the upper end of the pipe came within 2 ft. of the top of the shaft, and it was suggested that from these data it is possible to calculate the depth of the shaft. I would like to see this question answered in *Coal Age*. G. L. Black.

Imperial, Penn.

Disregarding the sagging of the pipe when resting in its inclined position, the pipe forms the hypotenuse of a right triangle, one side of which is the diameter of the shaft, or 20 ft., and the other is the depth of the shaft less 2 ft. Therefore, calling x the depth of the shaft, which is also the length of the pipe, we have, since the square of the hypotenuse is equal to the sum of the squares of the other two sides of the triangle,

$$x^2 = (x - 2)^2 + 20^2$$
$$x^2 = x^2 - 4x + 4 + 400$$
$$4x = 404; \text{ and } x = 101 \text{ ft.}$$

The shaft is therefore 101 ft. deep.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—State how you would develop, arrange, equip, officer and manage a gaseous and dusty mine to insure freedom from accumulation of gas and dust and the dangers incident thereto, keeping in view safety and economy.

Ans.—This question can only be answered in a general way, since the development, arrangement and equipment of a mine depend on a large number of conditions that cannot be assumed. For example, the development of a mine is dependent on the size of the undertaking, extent of territory owned or controlled and the facilities of shipping and marketing the coal. The surface and underground arrangement will likewise depend on these conditions and be modified by the character of the seam and underlying and overlying strata and amount of water to be handled, as these conditions largely determine the general plan of mining to be adopted. It may be stated that the main haulage roads of a gaseous and dusty mine should be made the intake airways. Also, such a mine should be divided into separate ventilation districts, each district being ventilated by a separate air split. Likewise, the equipment of the mine will depend on the amount of output desired and the market requirements in respect to the size and quality of the coal. In any case, the equipment should be such as to enable the handling of the daily output as expeditiously and economically as possible.

The officers of a gaseous and dusty mine, besides the manager and superintendent, should include one or more mine foremen and as many firebosses as may be required to thoroughly inspect the mine at all times during working hours. Too often the fireboss is given too large a territory to inspect thoroughly, and cannot be held responsible for accidents that are liable to happen on this account. In the management of a gaseous and dusty mine it is important to make and enforce strict regulations in regard to the inspection of the mine in the morning, before men are permitted to enter the mine, and during working hours while the men are at work in their places.

Where blasting is performed, careful attention should be given to the kind of explosives used and the manner of taking the same into the mine. No miner should be permitted to take more than a day's supply of powder into the mine. Wherever practicable, permissive powder should be used. All holes drilled for shooting the coal should be inspected, charged and fired by competent shotfirers after the men have left the mine, excepting those holes that the shotfirer condemns as being unsafe. No accumulations of fine coal or dust should be permitted at the working face or on the haulage road, and the mine should be supplied with a good system of watering or sprinkling both the roadways and the working places, so as to prevent as far as possible the suspension of fine dust in the air current. In the operation of such a mine, the largest economy is insured by the greatest safety, and this can be obtained only by maintaining a thorough inspection and discipline throughout the mine.

Ques.—If 25 kw. is to be delivered at a pressure of 500 volts for a distance of 1,000 yd. through a cable having a resistance of 0.0004 ohms per yd., what must be the pressure at the generator?

Ans.—It is first necessary to estimate the current transmitted, from the kilowatts and voltage delivered; thus,

$$C = \frac{W}{E} = \frac{25{,}000}{500} = 50 \text{ amp.}$$

The loss in pressure, or the line drop, is then calculated thus,

$$E = C\,R = 50\ (1{,}000 \times 0.0004) = 20 \text{ volts}$$

which must be added to the voltage required to be delivered and which makes the voltage required at the generator 520 volts.

Ques.—What methods would you adopt to overcome the dangers that arise from the presence of coal dust?

Ans.—Make and enforce strict regulations in regard to the loading out of all fine coal and slack. Permit no accumulations of dust at the working face. Use dustproof cars and have all roadways cleaned thoroughly and regularly. Where blasting is performed, use only permissible powders. If gas is present, have all holes inspected, loaded and fired by competent shotfirers, authorized to refuse to charge and fire any holes that in their judgment are unsafe. This work must be done after the men have left the mine.

Where the coal produces a particularly fine and inflammable dust, the ribs, roof and floor of every working face should be well watered and the place examined for gas before any shot is fired. Avoid the firing of two or more shots at the same time in a close heading or room, particularly where the gas and dust produced by the firing of one shot may be exposed to the flame of succeeding shots. Have all shots fired in rotation, beginning on the end of the air and advancing against the current. Also, give sufficient time for the smoke and gases to clear away before firing a second shot in a close place. Too great haste in the firing of shots has been the direct cause of many accidents that should have been avoided.

NOTE—Attention has been drawn to a misstatement of the formula given below, in the answer to the last question, *Coal Age*, Mar. 11, p. 472. The statement following the formula should read as follows:

$$\frac{q_1}{q_2} = \sqrt{\frac{25}{24}} = 1.02$$

That is to say, the first airway will pass 1.02 times the quantity that would pass in the second airway under the same pressure. In other words, a pressure that would pass 10,000 cu.ft. of air each minute in the second airway would pass 10,200 cu.ft. per min. in the first.

Coal and Coke News

Harrisburg, Penn.

In order to exchange views among the Anthracite mine inspectors of the state for safety within the mines, James E. Roderick, chief of the Department of Mines, and who has just received his fifth reappointment as chief of the department, on Apr. 13 and 14 met with the mine inspectors and went over with them the chief causes of accidents, emphasizing the necessity of seeing that the protective measures provided by law are taken, and urging upon them the study of new conditions of danger to the end that fatalities may be minimized.

It was brought out at the meeting that the number of fatal accidents during the first three months of this year shows an increase over the corresponding period of 1915. During January, February and March, 81 fatal accidents occurred in the districts comprising Luzerne and Carbon Counties, an increase of 10. During the same period there was an increase of 20 over the number of the first three months of 1915, in Schuylkill, Northumberland, Columbia and Dauphin Counties. In the remaining district, however, which includes Lackawanna, Susquehanna, Wayne and Sullivan Counties, there was a decrease of 7.

There was a general discussion of "safety first" measures, with special application to anthracite mining. The importance of exercising great care in the examination of candidates for positions as mine foremen and assistant mine foremen was also dwelt upon.

Excessive Fees Are Sometimes Collected

The Workmen's Compensation Board on Apr. 14, directed that the following letter be sent to every insurance carrier insuring against workmen's compensation liability within the state:

It has come to the attention of the Workmen's Compensation Board that in certain cases where compensation has been paid under agreements or awards to the attorneys of claimants, the attorneys have retained or induced the claimant to pay to them exorbitant fees or unduly large percentages of the installments paid, without having had their fees approved by the board, as required by section 501 of the compensation act.

The board emphatically disapproves of such practices on the part of the attorneys. In order that this may be impossible in the future, the board requests you to pay all compensation due, either under agreement or an award direct to the person entitled thereto, even though such person is represented by an attorney of record, unless the attorney shall furnish to you the board's approval of his claim for legal services and expenses.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Acting entirely upon its own initiative, the coal sales department of the Lehigh & Wilkes-Barre Coal Co., represented by Charles H. Gardner, has begun to distribute rebates due to customers. These are sums collected under the 1913 anthracite coal tax act. To each person who dealt directly with the company in purchasing coal, there will be returned the amounts designated on the bills as "tax," in most cases 8 cents a ton.

Mauch Chunk—The Lehigh Coal and Navigation Co. has issued notices announcing the reopening for navigation of the Lehigh Canal on May 15, which is somewhat later than usual.

St. Clair—The stripping contractors of the lower anthracite coal fields have been notified by the big powder companies that, owing to the war, they will not enter into yearly contracts with the contractors, who often use 100 kegs of explosives in one blast to uncover the coal beds. Along with the message came an increase of 25 cents a keg for black powder.

Plymouth—Ejectment proceedings were filed on Apr. 15, by Albert D. Shonk et al. against the Plymouth Coal Co. to recover surface and coal property, in that borough, which had been leased to the coal company, on allegations that the terms of the lease had been violated by a refusal to mine coal and pay royalties. Over a year ago the Borough of Plymouth secured an injunction to restrain the Plymouth Coal Co., from further mining under certain sections of the borough for the reason that it would endanger the surface. After considerable litigation the injunction was made permanent and the coal company ceased mining and abandoned the colliery.

Pottsville—Since the mines have been compelled to suspend for two or three days during the past few weeks, the companies are finding it difficult to get sufficient labor to operate the collieries due to the men seeking positions at much higher wages in other lines of industry, with steady time. During the past winter while the mines were in full blast there was some defection from the ranks, but most of the men with steady work before them hesitated until a season of short working time. During the past few weeks the men have left the various towns in the region by the hundreds going to the various industrial centers throughout Pennsylvania, New York and New England.

Pittston—A symposium of views on efficiency in mining will be the feature of the program at the annual banquet of the Pittston Mining Institute on Apr. 29. Prominent mining men from the Luzerne-Lackawanna district will be the speakers. W. H. Gillespie, a Pittston attorney, will be toastmaster.

The No. 3 shaft of the Pennsylvania Coal Co., in this city, has been equipped with electrical apparatus, completely dispensing with the use of steam.

Bituminous

Beaverdale—Five families were rescued on Apr. 12, when five dwelling houses, belonging to the Beaver Run Coal Co., burned to the ground. Many of the inmates narrowly escaped but no one was seriously burned. The origin of the fire is not known. There is no fire department in the town and the employees of the mines volunteered as firemen. They were able to save a long row of dwellings near the houses which burned. These, however, took fire several times.

Masontown—Jasper Hughes, aged 17, was killed recently, while engaged in a friendly wrestling match at the mine of the Bessemer Coal and Coke Co. Hughes was accidently pushed against the frail shed of the fan house, which collapsed, throwing him against the fan.

Morrellville—Formal announcement has been made that the strike of the miners of the Morrellville Coal Mining Co. has been brought to a close. The miners have agreed to go back to work on the increase granted them some time ago. This amounts to 3 cents on the ton for pick mining.

Somerset—The tonnage of the Consolidated Coal Co. for the period of Jan. 1 until Apr. 7 amounted to 2,857,000 as against 2,330,000 tons for the same period in 1915. The company has already contracted for its entire output for the present year.

The annual examination for mine foremen and firebosses was recently held. The examining board was composed of Mine Inspector Fletcher W. Cunningham, of Somerset, Richard Maize, superintendent of the Jenner-Quemahoning Coal Co.'s operation and Louis Berkey, a miner.

Windber—Between 100 and 150 men employed at the Hagevo mine of the Shade Coal Mining Co. recently went on strike. This strike appears to be peculiar in that it was reported that the men had made no complaint to the mine operators and had asked for no concession, nor had they, according to mine officials, declared a strike. Nevertheless the men quit work and the operation was suspended.

Washington—Two thousand miners recently returned to work in the Monongahela Valley following a strike of two months. At the Acme mine of the Pittsburgh-Westmoreland Coal Co., at Bentleyville, 600 men who struck to have their district registered in the third pool instead of the fourth, returned to work without having their demand granted. At California, where 1,400 men were on strike as the result of the presence of two locals of the United Mine Workers, a compromise was affected and the miners resumed work.

Greensburg—The Keystone Coal and Coke Co. recently purchased from the Sisters of Charity of the Seaton Hill Schools the coal underlying land owned by that order. The consideration was placed at $212,937.60.

Ellsworth—Miners of the Ellsworth and Cokeburg mine, of the Ellsworth Collieries Co., were recently paid off and an indefinite suspension ordered following trouble lasting about 10 days, over the wage scale. The closing down of the mines is somewhat of a surprise to many.

Boswell—It is announced that a first-aid meet will be held here in June. It is expected that all the big coal companies of Somerset County will take part in the meet. It is also likely that a tourney will be conducted in Cambria County this summer.

Connellsville—Figures compiled by the "Connellsville Courier" from official sources show that the production and shipment of coke in the Connellsville region during the first quarter of 1916 amounted to over 5,600,000 tons, or at the rate of 22,500,000 tons a year. This will exceed by 2,500,000 tons the record year of 1913, if production is maintained, which is indicated by the sale of coke for second-quarter delivery at $3 a ton. Even greater production is expected the latter part of the year, as the United States Steel Corporation has now under construction at Clairton, Penn., 600 ovens in a byproduct plant which will be increased to 1,500 within the next 12 months.

Canonsburg—Four hundred employees of the Chartiers Creek Coal Co. recently went on strike over a disagreement with the mine owners concerning the selection of a physician.

WEST VIRGINIA

Clarksburg—One of the largest deeds ever executed in West Virginia was recently signed, sealed and acknowledged when the property of the Four States Coal Co., located in Marion and Raleigh Counties, was conveyed to its new owner, J. D. Ayres, of Pittsburgh, by C. E. Smith, of Fairmont, who is a special master in the Federal Court Proceedings that brought about the sale of the property. The deed which will be recorded in both Marion and Raleigh Counties instead of being an ordinary typewritten document was a printed volume containing more than 250 pages. The consideration named was $100,000. In addition to paying this in cash, however, $4,500,000 of bonds, together with a large amount of unpaid interest and receivers certificates, were assumed.

Huntington—The Island Creek Fuel Co. recently leased an engine from the Chesapeake & Ohio Railroad Co., to help handle its large contract with the Pittsburgh Coal Co. By using this locomotive and the one owned by the Island Creek company, something like 6,500 tons of coal is being loaded daily into barges.

Welch—Every mine in this district is busy and the loading of coal exceeds all previous records, averaging 30,000 cars per month. Labor is growing scarce.

Thurmond—Coke ovens were recently fired in this region, many of which have been idle for years. It is believed that the coke market will remain strong for a year or two, giving a price good enough to justify the repairing of the ovens.

Beckley—The Lanark Coal Co., at Lanark, has opened its No. 5 drift and is shipping from it about four cars per week. A new engine was recently installed for the supply hoist.

ALABAMA

Cordova—The first shipment of coal by the DeBardeleben Coal Co. from Cordova to New Orleans on the Warrior River without transfering, left recently. The cargo was of 850 tons. The distance—600 mi.—will be made in four days.

KENTUCKY

Whitesburg—Increased operating schedules have been announced by the Elkhorn Mining Corporation to apply to mines in its Fleming, Haymond and Hemphill fields, effective May 1.

West Point—Two hundred and eighty miners employed in a local mine struck recently, their grievance being that the company would not haul them on the electric train inside the mine.

OHIO

Bellaire—The No. 2 mine of the Pittsburgh-Belmont Coal Co., located at Neff, west of Bellaire, is making preparations to resume work. The interior of the mine is being cleaned up and several repairs are being made to the exterior buildings. This mine has been idle since the beginning of the strike, three years ago. When working full it employs several hundred men, although the full quota will not be put on at the start.

ILLINOIS

Taylorville—John White, mine superintendent at Mine No. 8, at Tovey, near here; Charles Adcock, of Kincaid, assistant mine superintendent; William Morgan and John Orpentah, of Tovey, were badly burned recently when their lamps ignited a gas pocket in the mine. They were brought to a hospital here in an unconscious condition. The explosion occurred when the four men entered a room to get their tools. Two other men were knocked down but were not injured.

Belleville—The property of the Southern Coal and Mining Co., consisting of eight mines in operation along the Southern Ry. was sold at auction at the courthouse in Belleville a few days ago, under an order of court. It was bought in by J. E. Lockwood, secretary and treasurer of the Southern Coal, Coke and Mining Co., for $225,000. The sale grew out of the reorganization of the company, under a mortgage for $1,100,000 which, together with interest and costs, amounted to $1,273,508.93. There has been considerable litigation between different groups of bondholders, but the sale was desired by the company and was a purely formal transaction. The money derived from the sale will be used in paying judgments and debts against the property. The sale notice described all the properties in detail and its reading, at the beginning of the sale, occupied an hour and a half.

COLORADO

Oak Creek—Hayden Brothers Coal Corporation has closed down the mine at Oak Creek, Routt County, Colo., on the Denver & Salt Lake R.R. It is not known whether it will resume operations in the late summer or autumn.

Junction City—The Routt Electric Coal Co. has closed down the mine at Junction City, Routt County, Colorado, on the Denver & Salt Lake R.R., near Oak Creek, and is moving the equipment to the new mine it is opening south of Bear River in the same county and on the same railroad.

WYOMING

Hanna—Examinations for mine foremen and firebosses will be held at Hanna on Apr. 26, 27 and 28, about 10 men are expected to take these examinations. The examining board will consist of George Blacker, F. L. McCarthy and Thomas Cook.

PERSONALS

John T. Davis has succeeded his father, the late Henry G. Davis, as president of the Davis Collieries Co. C. M. Hendley is treasurer, and R. B. Isner will be general manager and secretary.

Robert Johnson, mine inspector in the Sixth anthracite district of Pennsylvania, discussed the Workmen's Compensation Act for the benefit of the members of the Pittston Mining Institute, at the meeting on Apr. 17.

John Campion, of Denver, Colo., capitalist and owner of coal lands, some of which are leased to operating companies, has been confined to his house for several weeks past, with what his physicians consider a general breakdown.

Rose Weibel, who for some time was with the Louisville office of the St. Bernard Mining Co., has gone to Pineville, Ky., where she will be at the headquarters office of the White Star Coal Co., as secretary to the president, White Moss.

William McFadden has resigned as superintendent of the Bear River Coal Co. at Bear River, Routt County, Colo., effective Apr. 15, and is succeeded by David Lewis, who has been mine foreman for the Yampa Valley Coal Co., at Oak Creek, same county.

Thomas C. Gleason, for 12 years superintendent of the Stafford Coal Co., at Baxter, W. Va., was recently presented with a gold watch and his wife with a handbag by the employees of the firm upon the occasion of his leaving for a new field. Mr. Gleason's successor is Samuel Hale.

Edward A. Uhrig was recently elected president of the Milwaukee-Western Fuel Co. At the same directors' meeting, Alexander B. Uhrig was elected vice-president, B. W. Moody, formerly secretary and treasurer was made vice-president, Joseph W. Simpson, formerly assistant to the president was made a vice-president, as was Alfred Teller, formerly manager of country sales, Chester Moody was made treasurer, Edward U. Demmer was made secretary, B. R. Moody was elected assistant secretary and treasurer, and William S. Ardern was reëlected general superintendent in charge of dock operations.

Arnold Hirst, superintendent of the Conifer operations, has been appointed general superintendent of operation of the mines of the Allegheny River Mining Co., with headquarters at Kittanning. Mr. Hirst will report to the president. His successor will be John Woodall who has been mine foreman at the Hunts Run operation. Hugh Ferguson, assistant mine foreman at the Chicasaw mine is appointed acting superintendent of the Chicasaw operation, vice Thomas Hall resigned.

E. L. Ransome, founder of the concrete machinery business, will remain with the Ransome Concrete Machinery Co., which has recently been reorganized, obtaining sufficient capital to carry on its business, as chairman of the Board of Directors and consulting engineer. Frank L. Brown, of San Francisco, is president and manager of this firm.

OBITUARY

Alexander Coulter, aged 40, prominent millionaire coal operator and sportsman, died at his home in Greensburg, Penn., on Apr. 13, of pneumonia. He was a son of Gen. "Fighting Dick" Richard Coulter of Civil War fame.

RECENT COAL AND COKE PATENTS

Boiler Brick. R. J. Allen, New York, N. Y. 1,168,697, Jan. 18, 1916. Filed Sept. 25, 1915. Serial No. 52,733.

Grate Bar. W. C. Armstrong, Springfield, Ohio. 1,169,107, Jan. 25, 1916. Filed May 20, 1912. Serial No. 698,366.

Mine Car Coupling. W. Towers, Christopher, Ill. 1,150,980 Aug. 24, 1915. Filed May 27, 1914. Serial No. 841,329.

Water Tube Boiler. F. W. Guibert, Detroit, Mich. 1,168,880, Jan. 18, 1916. Filed July 11, 1914. Serial No. 850,373.

Mechanical Stoker. O. Wundrack, Maywood, Ill. 116,837, Jan. 18, 1916. Filed Apr. 27, 1912. Serial No. 693,555.

Coke-Oven Burner. A. Roberts, Evanston, Ill. 1,169,570, Jan. 25, 1916. Filed Sept. 8, 1914. Serial No. 860,583.

Boiler-Furnace Feeding Service. J. G. Crawford, Chicago, Ill. 1,169,242, Jan. 25, 1916. Filed Jan. 2, 1913. Serial No. 743,287.

Smoke and Dust Consumer. A Pool and R. Kean, Indiana Harbor, Ind. 1,171,750, Feb. 15, 1916. Filed Oct. 21, 1915. Serial No. 57,072.

TRADE CATALOGS

A. M. Byers Co., Pittsburgh, Penn. Bulletin No. 26. Illustrated; 24 pp., 8½x11 in.

The Jeffrey Mfg. Co., Columbus, Ohio. "Jeffrey Fans for Mine Ventilation." Illustrated; 8 pp., 6x9 in.

The Berger Manufacturing Co., New York, N. Y. "Berger Steel Lockers." Illustrated; 12 pp.; 4x8¾ in.

Beaudry & Co., Inc., 141 Milk St., Boston, Mass. "Beaudry Power Hammers." Illustrated, 20 pp., 6x9 in.

The Emerson Pump and Valve Co., Alexandria, Va. "Emerson Steam Pumps." Illustrated; 79 pp.; 6x9 in.

Joseph Dixon Crucible Co., Jersey City, N. J. "Valuable Graphite Products." Illustrated; 24 pp.; 3½x6½ in.

J. A. & W. Bird & Co., 88 Pearl St., Boston, Mass. "Magnite, the Perfect Paint." Illustrated; 10 pp., 4½x7½ in.

B. F. Sturtevant Co., Hyde Park, Boston, Mass. Bulletin No. 221. "Electric Fans." Illustrated, 24 pp., 6½x9 in.

American Spiral Pipe Works, New York and Chicago. "Lap Welded Steel Pipe." Illustrated; 8 pp.; 7½x10 in.

The C. A. Wood Preserver Co., Inc., St. Louis, Mo. "Conservation by Preservation." Illustrated; 36 pp.; 7x10 in.

Trussed Concrete Steel Co., Youngstown, Ohio. Catalog. "Portable Steel Buildings." Illustrated, 32 pp., 8½x11 in.

Hill, Hubbell & Co., 805 Superior Ave., Cleveland, Ohio. "Bitumastic, Its Use on Shipboard." Illustrated, 19 pp., 6x7 in.

The American Steam Dredge Co., Fort Wayne, Ind. "Single Line Revolving Steam Shovels." Illustrated; 8 pp., 8½x11 in.

Keystone Driller Co., Beaver Falls, Penn. "Downie Centrifugal Pumps," Bulletin No. 801. Illustrated; 48 pp.; 3½x6 in.

The Scranton Pump Co., Scranton, Penn. Bulletin No. 103. "Jet Condensers and Vacuum Pumps." Illustrated, 12 pp., 6x9 in.

Stephens-Adamson Manufacturing Co., Aurora, Ill. Catalog No. 22. "S-A Pivoted Bucket Carrier." Illustrated, 84 pp., 6x9 in.

Kingsford Foundry and Machine Works, Oswego, N. Y. Catalog No. 18. "Type L Turbine Pumps." Illustrated, 22 pp., 6x9 in.

The Toledo Pipe Threading Machine Co., Toledo, Ohio. "Toledo Pipe Threading Handbook." Illustrated; 72 pp.; 4x7 in.

Frank L. Patterson & Co., 26 Cortlandt Street, New York. "Hot Water Service Heaters and Converters." Illustrated; 23 pp.; 6x9 in.

A. S. Cameron Steam Pump Works, 11 Broadway, New York. Bulletin No. 154. "Centrifugal Pumps." Illustrated, 12 pp., 6x9 in.

The Brown Hoisting Machinery Co., Cleveland, Ohio. Catalog U. "Brownhoist Transfer Cars and Larries." Illustrated, 32 pp., 6x9 in.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill. Bulletin No. 72. "Sullivan Drill Sharpener." Illustrated, 24 pp., 6x9 in.

Hill, Hubbell & Co., 805 Superior Ave., Cleveland, Ohio. "Bitumastic. Permanent Protection for Steel." Illustrated; 23 pp., 6x7 in.

Storage Battery Locomotive Co., St. Louis, Mo. Bulletin No. 46. "Storage Battery Locomotives for Coal Mines." Illustrated, 8 pp., 8x11 in.

Standard Wood Pipe Co., Williamsport, Penn., Folder No. 3. "Rubberized Wood Pipe and Square Wood Pipe." Illustrated; 4 p.; 5½x9 in.

Emmott & Co., Ltd., Manchester, England. The "Mechanical World Pocket Diary and Year Book for 1916." Illustrated; 429 pp.; 4x6 in.

Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y. Bulletin No. 1015. "Duratex Switchboard Cords." Illustrated, 18 pp., 8x10 in.

General Electric Co., Schenectady, N. Y. Bulletin No. 44,005. "Line Material and Rail Bonds for Mine and Industrial Haulage." Illustrated, 76 pp., 8x10½ in.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1632A. "Centrifugal Pumps and Centrifugal Pumping Units." Illustrated, 46 pp., 8x10½ in.

The Chicago Pneumatic Tool Co., 1010 Fisher Bldg., Chicago. "Chicago Pneumatic Compressors and Giant Fuel Oil and Gas Engines." Illustrated; 16 pp.; 3¼x6¼ in.

Alberger Pump and Condenser Co., 140 Cedar St., New York. Bulletin No. 21. "Alberger Centrifugal Boiler Feed Pumps, Alberger-Curtis Steam Turbines." Illustrated, 28 pp., 6x9 in.

Ingersoll-Rand Co., 11 Broadway, New York. Catalog No. 76. "Water Lifted by Compressed Air." Illustrated, 80 pp. 6x9 in. Form No. 9201. "Calyx Core Drills." Illustrated, 128 pp., 6x9 in.

General Electric Co., Schenectady, N. Y. Bulletin No. 42,206. "Curtis Steam Turbine Generators." Illustrated, 40 pp., 8x10½ in. Bulletin No. 43,253. "Series Luminous Arc Lamps." Illustrated, 16 pp., 8x10½ in.

Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Booklet No. 213. "Simplate Flat Disk Valves." Illustrated, 10 pp., 3½x6 in. Bulletin No. 216. "Hummer Self-Rotating Hammer Drills." Illustrated, 28 pp., 6x9 in.

The Condit Electrical Manufacturing Co., Boston, Mass. Bulletin 401-A, "Type 1-D Oil Switch." Bulletin 401-B, "Type 1-D Oil Switch." Bulletin 401-C, "Type 1-D Oil Circuit Breaker." Bulletin 410, Type P. K.-5 "Pole Line Oil Switches." Bulletin 411, Type M-5, "Manhole Oil Switches." Illustrated; 4 pp.; 6x9 in.

INDUSTRIAL NEWS

Beaverdale, Penn.—The clubhouse of the miners of the Beaver Run Coal Co. destroyed by fire some weeks ago, will be rebuilt in the near future. A larger and better structure will be erected.

Empire, Ala.—The Empire Coal Co. has just finished making plans for changing its mines at Empire over from steam to electricity. This change will be of considerable importance to the immediate vicinity.

Rice's Landing, Penn.—The Crucible Coal Co. is reported as enlarging its plant two miles from this place. Eighty miners' houses are to be erected, and an airshaft will be sunk. This company owns 6,000 acres of coal land in Greene County.

Chicago, Ill.—The Chicago office and salesroom of the Goulds Manufacturing Co. has been moved to 12-14 South Clinton St., Chicago. This firm will still retain its warehouse at 3801 to 3811 South Ashland Ave., where it has been located for four or five years.

Columbus, Ohio—Local coal operators have learned that the Baltimore & Ohio, in order to relieve the pressing demand for more coal cars from the mines along its lines, has leased 1,000 cars from the Chicago, Burlington & Quincy and a like number from the Illinois Central.

Uniontown, Penn.—Mortgages on the Tower Hill-Connellsville Coke Co., were foreclosed Apr. 15 by Joseph Nutt and executors of the Frank Osborne estate, all of Cleveland, Ohio. The petition showed outstanding and overdue unpaid bonds of $1,000,000, secured by the mortgages, and accrued interest of $100,000.

Pottsville, Penn.—Suit has been brought in the courts here on behalf of the Catholic Church at Maizeville, Penn., against the Harleigh-Brookwood Coal Co. It is alleged that the mining company is undermining a church building and the authorities of the church seek to restrain the coal company from endangering the property.

New York, N. Y.—The Combustion Engineering Co. has removed its offices from the 13th to the 8th floor of No. 11 Broadway, where larger quarters have been secured. The firm has also added a Cincinnati, Ohio, and a Birmingham, Ala., branch office, and is planning to open an additional office in Atlanta, Ga., in the near future.

Pittsburgh Penn.—The Baird Machinery Co. will in the future distribute the Stevens line of mine equipment, such as mine cars, car wheels, hitchings, mine fans, cages, etc. This firm also carries a considerable stock of rope, nails, spikes, bolts, scales, telephones, pipe fittings, valves, machine and blacksmith-shop supplies and tools.

Charleroi, Penn.—Using a pontoon system, river men of the Vesta Coal Co. recently raised one of the two steel barges which sank with 60,000 bu. of coal when they went over the dam at Lock No. 4 on Mar. 10. Ten days and nights of continuous work was necessary to raise the barge from the river bottom. None of the coal in the barge was saved.

Harrisburg, Penn.—The production of anthracite during the month of March amounted to 6,127,351 gross tons, being 431,045 tons more than for February, 1916, and an increase of 1,052,058 tons over March, 1915. For the three-month period of the present year the shipments amounted to 17,708,007 tons as compared with 14,258,807 for the similar period of 1915.

York, Penn.—The ice having gone out of the river the dredgermen have just begun their activities of recovering coal from the bed of the Susquehanna. There are over ten barges working in this vicinity. The greater part of the coal is being sold to a paper manufacturing company at York Haven, which receives the coal by means of an elevator from the river bank.

Alliance, Ohio—It is stated that 39 steam shovels will be used by the Carter Construction Co., of New York, in developing the large tract of coal land a few miles from here, which the Pennsylvania R.R. Co. is planning to open. It is calculated that the excavation will total almost 55,000,000 cu.yd. of earth. The steam shovels will first strip the coal bed and will then load the coal.

Philadelphia, Penn.—The Philadelphia & Reading Ry. in the month of March regained its lead as the heaviest shipper of anthracite coal. For several months the Reading had been outdone by the Lehigh Valley, but during the month of March took first place with shipments of 1,237,378 tons, with the Lackawanna second with 1,063,665, and the Lehigh Valley in third place with a tonnage of 1,063,655 tons.

Cleveland, Ohio—Headquarters of the Pittsburgh Vein Operators' Association have been moved from Wheeling, W. Va., to Cleveland, with offices in the Marion Building. C. P. White has been named as secretary of the association succeeding Mary Grogan, appointed temporarily to fill the place of John V. Whalen, resigned. Miss Grogan came from Wheeling to enter the headquarters office.

Boston, Mass.—In a recent paragraph the Boston News Bureau estimates that the prevailing prices for bituminous coal in this city are about 20 per cent. above the normal price, and probably 30 per cent. better than the low prices which ruled during 1914 and 1915, when the coal trade was at its worst. These estimates are based on the present market price, quoted at $1.15 and $1.20 per ton at the mines.

Charleston, S. C.—The departure of the steamer "Pleades" from the Southern Ry.'s new coal export terminal at Charleston for Buenos Aires, loaded with 5,000 tons of Clinchfield coal, marks the completion of the first actual step in the development of what is hoped to be a large traffic in coal between South America and the Southern coal field through the port of Charleston. Several cargoes have been shipped from this terminus to Cuba, but this is the first to South America.

Philadelphia, Penn.—British ship owners are becoming much exercised by the loss of tonnage in the carrying of coal. Of 23 cargoes of fuel from this port in March only six carried the British flag, most of the vessels belonging to either Norway or Sweden. Formerly practically all coal cargoes from here were carried in British bottoms. It is also reported that of 2,085 cargoes clearing from the British Isles during the same month all were neutral ships with the exception of 495.

Harrisburg, Penn.—One big bed of river coal has been found by employees of the Harrisburg Light and Power Co., but the deposits this year are below the usual standards, despite high water which in former years brought down rich deposits from the mines. All of the barges of the company, three pumps and three steamboats are now at work to bring the coal down the stream from points above the city. It is estimated that about 90,000 tons were taken from the Susquehanna River last year.

Columbus, Ohio—The Jeffrey Manufacturing Co. recently organized a new contractors' plant department to handle a line of small rock and ore crushers as well as elevators, conveyors and screens. These machines have been developed and are particularly adapted to use in road building, contracting, mining, rock-crushing, etc. This department will be in charge of Leroy A. Kling, formerly sales manager of the road machinery and limestone crusher department of the Wheeling Mould and Foundry Co.

St. Louis, Mo.—The municipal dock at the foot of O'Fallon street was dedicated Apr. 12. The same day the "Inco I," the first self-propelled steel barge of the Inland Navigation Co., reached St. Louis and was given an enthusiastic welcome. The barge immediately began loading and departed Saturday afternoon on its first trip to New Orleans. Other barges are being built and in another year the company will have a fleet operating between St. Louis and New Orleans and will also send barges as far as St. Paul.

Philadelphia, Penn.—Local export shippers of coal have been notified of the extreme shortage of fuel in Spain on account of so many colliers flying the British flag having been sunk by enemy submarines. Recently one of the important railroads in the south of Spain was compelled to entirely suspend operation on account of lack of coal. Spain depends almost entirely on England for its fuel supplies and while efforts are being made to secure coal from this country, the chances are not good on account of the continued scarcity of bottoms.

Norfolk, Va.—A total of 1,393,859 tons of coal were dumped over the Hampton Roads coal pier, Lambert Point, Sewall Point and Newport News during the month of March. The dumpings for the month show an increase of 105,822 tons over those of February, when 1,278,037 tons were dumped. The Norfolk & Western R.R. dumped a total of 626,880 tons of coal over the Lambert Point piers during the month. The Virginian R.R. was second, with a dumping of 389,301 tons over the Sewall Point pier. The Chesapeake & Ohio dumped 377,678 tons over the Newport News piers during the month.

Washington, D. C.—Arguments in the appeal of the Secretary of State of Wisconsin for dissolving an injunction obtained in the state by the Philadelphia & Reading Coal and Iron Co. to prevent the state revoking its license to transact business there were heard on Apr. 13, by the Supreme Court of the United States. Wisconsin's foreign corporations act is the basis of the litigation. The constitutionality of the act is attacked by the coal company on the ground that it interferes with interstate commerce, impairs the obligations of contracts, is a deprivation of property without due process of law and denies equal rights under the law to persons within the state.

Nashville, Tenn.—Steps are being taken by the local Traffic Bureau to secure reparation of 10c. per ton for buyers of coal in car lots at Nashville from the Louisville & Nashville Railroad Co., as well as to secure restoration of the rate to 80c. The commission has decided a former case in favor of Nashville, granting a rate of 80c. for two years, but on the recent revision of rates becoming operative this year, the railroads put the rate back to 90c. This rate is from eastern Kentucky mines. The traffic bureau has filed formal complaint with the Inter-State Commerce Commission and is calling on the coal handlers for data on which to prosecute the complaint.

Columbus, Ohio—The preliminary organization of the Southern Ohio Coal Exchange, including operators in the mining districts of the Hocking Valley, Crooksville, Pomeroy Bend and Jackson has been completed at a meeting held in Columbus Apr. 14 and 15. The matter has been up for several weeks, during which time the leading operators in the district gave their unqualified approval of the objects of the organization and entered enthusiastically into the association. Another meeting is scheduled for Apr. 22 when a special committee consisting of U. S. Morris of the Superior Colliery Co., W. L. Timmons of the Zanesville Coal Co., Dr. Biddle of the Poston Consolidated Coal Co., and G. H. Barker of the Maynard Coal Co. will report on complete plans for the organization.

Market Department

General Review

Mine operations curtailed and market dominated by uncertainties concerning the new circular. More bituminous contracts concluded. Lake loading getting under way and market moderately firmer. Middle Western situation dull with mine operations rigidly curtailed.

Anthracite—The market is dominated entirely by the uncertainties in the labor situation. The sales agencies are frankly at a loss as to the future and as a consequence have assumed a passive attitude; no attempt is being made to urge sales and the question of stocking up at current prices is left entirely with the buyer. In the meantime mining operations are rigidly curtailed, while supplies are plentiful, though they would not be sufficient to meet an active demand. No definite announcement concerning the usual spring discount has come forth, and the best opinions now are, that no reduction of any kind will be made, or at best a very slight one. However, it is well established that some of the individual operators are quietly cutting prices on the prepared grades in spite of vigorous denials. What activity there is centers largely on the steam sizes and the fact that one of the best informed companies is rapidly cleaning out its surplus stock of this grade, would seem to indicate expectations of an early settlement of the anthracite wage question.

Bituminous—The final arrangement of the Central Pennsylvania wage scale on about the lines anticipated, was pretty well discounted and affected no change in the bituminous situation, other than the elimination of this uncertainty. The market continues decidedly mixed, the more remote districts suffering from inadequate transportation, being hard pressed for coal, while those sections contiguous to the mining regions are well stocked and buyers exacting as to quality and prices. Spot demand is confined almost entirely to high grade coals, which are generally all taken on contracts. Inquiries on new contracts are somewhat more numerous, and a number of important tonnages have been covered at the established advance for the season. The extra demand for railroad equipment for Lake loading has adversely affected transportation conditions at the seaboard and shippers are beginning to consider the possibility of incipient shortages and embargoes throughout the year.

Lake Trade—The market is somewhat firmer particularly as regards Pittsburgh district coal, but is still much upset by transportation difficulties and incipient labor troubles reported from different localities. The outstanding feature of the current situation is the undoubted fact that industrial and steam consumption continues at the maximum and the technical position of the market is excellent. Some large contracts have recently been negotiated at substantial increases over the old figures. Special efforts are being made to clear out ice at different points in the Lakes. Shipments were started last week and all the loading ports are gradually getting into operation, although the movement to date is practically negligible. There has been no reason so far for revising the early estimate of a record-breaking shipment of coal to the upper Lake ports, with the possible exception that coal shippers will not be able to obtain an adequate supply of vessels.

Middle West—The market is flat, with most of the mines closed down entirely or working only one or two days a week to fill contracts for steam coal. Steam consumers have apparently dropped out of the market on the announcement of the recent advance but domestic buyers appear to be confident that contract prices will rule substantially below the market and are showing more of a disposition to cover their requirements. What few steam contracts have been closed, were concluded at an advance and with some large railroad business soon coming up for consideration, more activity is looked for in this line. Numerous test shipments are being made by rail into the Northwest, but little or no business is being concluded. Operators are becoming much concerned over the labor question.

A Year Ago—Heavy curtailment by anthracite companies. The effect of the increased export bituminous business felt in all sections but trade continues dull. Lake shipping increasing but still light.

Business Opinions

Boston News Bureau—There is nothing radically wrong with the situation. General trade continues large, our big industrial concerns are booked with orders months ahead and cannot well take new orders. Profits are rolling up as never before and yet we keep feeling that it is temporary and will end suddenly. The country is disturbed because of the trouble with Germany and Mexico. Washington is a sore spot owing to the apparent inability of the Administration to adjust matters satisfactorily. There is money galore. Rates hold steady owing to the federal bank act. Less reserves are required and loans and deposits are larger. But the unsettling features cannot continue much longer. We must certainly know something about Germany soon and also about Mexico.

Iron Age—The uppermost concern of the week in steel and security markets has been the intimation of the leading buyer of munitions that the British and French war departments are now "relatively independent" of the United States in munitions supplies. The conclusion jumped at in some quarters of an early falling off in exports of war steel is far astray. Buyer's finesse is no new thing. It is quite well established that British contracts already closed, including a large one placed late in March with the Steel Corporation, call for practically all the shell and shrapnel steel this country can supply in 1917. Offers of further large amounts, chiefly for France and Italy, in the past two weeks have found mills unable to accept the business. While the facts about recent war-steel business are guarded to an unusual degree, it is known that some large inquiries are out.

Bradstreet—Neither high prices nor fears of international political complications are sufficient to check the superabundant activity prevailing in trade and industry, and the country continues setting up new standards for future comparisons. Buying of staple articles continues wonderfully active, and another leap forward is expected when inland navigation actually opens. Winter wheat crop conditions are better than a while ago, jobbers are busy, mail-order houses are doing more than well, collections are good and money is firmer.

Dun—All legitimate enterprise continues to prosper, the absence of speculative excesses affording the best assurance of sustained progress. Fundamental conditions strengthen as strictly domestic influences become increasingly potent, and wholesome optimism characterizes reports from every leading center and section. There is still complaint, however, of the annoyances and delays incidental to the rapid development of trade and industry. Commercial failures this week in the United States are 361 against 342 last week, 381 the preceding week and 501 the corresponding week last year.

American Wool and Cotton Reporter—A prominent topic of discussion in the Boston wool market is the situation among the wool growers of the West. In Montana, prices are very high. The old cry of "four pounds for a dollar" has been changed to "three pounds for a dollar." It is reported that an effort is being made to contract Montana wool around 29 to 30c. In the woolen and worsted goods market the situation is strong. Prices are so high that purchasers will have to be educated to the higher standards.

Dry Goods Economist—There is scarcity in certain lines and there are indications that prices will go higher, especially if retailers show themselves willing to pay the advances. It is costing mills more to produce fabrics, and manufacturers in other lines have to pay more for the materials which they make up. The dyestuff situation is as serious as ever, and the prospects for Congressional action that would encourage the extension of the industry in this country are at present not favorable. Foreign manufacturers being almost wholly out of the market, our mills must fill up this void as far as this country is concerned.

Marshall Field & Co.—Wholesale distribution of dry goods for the week is much in excess of the corresponding period of past years. Road sales continue to exceed those of a year ago, for both immediate and fall deliveries. More customers have been in the market during the week. Collections are ahead of the same period last year. Prices are firm.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River shorten up at Hampton Roads; contract demand steady and local market strong. Georges Creek tonnage light. Pennsylvania grades fluctuating with mine conditions. Anthracite continues in active demand.

Bituminous—There are signs of a somewhat shortened supply of Pocahontas and New River coals at Hampton Roads. This is a new development and is occasioned by increased demand from the Lakes. The car situation on the Virginia railroads is already affected to a considerable extent. The agencies are withdrawing quotations that were based on a free movement of coal to Tidewater and prices are correspondingly firmer. At the same time the coastwise demand cannot be said to have improved and for the present the only effect will be diminished receipts at the piers.

Contract demand is still pressing, consumers having practically no opportunity to accumulate coal. There is also a good deal of uneasiness over the outlook for transporting coal, particularly from Hampton Roads. Quite a volume of business remains uncovered and there is considerable doubt about how some consumers are going to get their supply.

The anxiety in many quarters especially near the seaboard over the prospect of intermittent embargoes throughout the year againt all-rail deliveries is causing a steady if not an increasing demand for coal at distributing points like Boston and Providence. Prices maintain the level of a week ago, being still governed largely by marine freights.

Georges Creek deliveries are still at a minimum. Season prices are no longer being quoted and for spot delivery only restricted tonnages are available. Barges and steamers that ordinarily load this grade almost exclusively at Baltimore are continuing to load part of the time with Pocahontas or New River at Hampton Roads, these cargoes in most cases being applied to Georges Creek contracts.

Troubles in the Fairmont region in West Virginia are only an extension of similar local difficulties in central Pennsylvania. This all has the effect of hardening prices and making shippers wary of naming prices for futures. On all the Pennsylvania grades the situation is therefore more or less in the air for contract business. Deliveries for the summer months are dealt with somewhat more freely on the range of figures reported last week. At New York and Philadelphia loading dispatch is uncertain and most shippers are guarded in the volume of coal they allow to run to the piers. Practically all grades are in good request, however, at these points and an active summer market is looked for. Inquiries continue to come from consumers who would ordinarily take their supplies all-rail. Lower marine freights from New York will have a tendency to increase shipments from the New York ports, although embargoes are always threatening.

Anthracite—The milder weather has of course relieved some of the pressure for domestic sizes, but stocks are low in New England and there is still much anxiety over possibilities the next two or three months. The larger dealers for the present are taking on coal as fast as they can get it shipped and they will probably continue to do so as far as storage will permit.

Cargoes have begun to move forward to points like Bangor and Augusta, Me., but the unfavorable weather has prevented shipments in anything like the usual spring volume.

Broken and pea are still the sizes in shortest supply, although the buckwheats are not far behind in the demand.

Retail prices are not likely to be reduced in this territory until new circulars are issued at wholesale after an agreement is reached on the mine wage scale.

Bituminous at wholesale, f.o.b. loading ports at points designated, is quoted about as follows per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.75@3.20	$3.05@3.50	.....	$1.45@1.90
Cambrias and Somersets	3.00@3.45	3.30@3.75	.....	1.70@2.20
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	$2.00@2.10

Pocahontas and New River are quoted at $2.80@2.90, f.o.b. Norfolk and Newport News, Va., and $5.25@5.75 on cars, Providence or Boston.

NEW YORK

Anthracite supply sufficient for dull market. Mines working about half time. Bituminous buying slow. High grades held for contracts. F.o.b. prices drop.

Anthracite—The supply of coal is sufficient for a dull market but would not be for heavy buying. The mines are working about half time, generally speaking. Buying has settled down to only actual needs pending the outcome of the negotiations for a new wage scale. The situation is being watched closely by the dealers who in turn are advising their customers to do the same.

The supply of prepared sizes at the Tidewater docks is heavy. Owing to continued embargoes affecting inland New England points, there is a good call for water deliveries.

The steam sizes are becoming scarce owing to the curtailed production, while the demand remains brisk. Some shippers who loaded cargoes of buckwheat No. 1 during the recent high-price period are having a hard time trying to dispose of it at a profit. All the buckwheat coals are bringing about company circular though some sales of No. 1 were reported late last week at slightly below.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$5.05	.....	Pea	$3.50	$3.40@3.50
Egg	5.30	$5.30@5.30	Buck	2.75	2.65@2.75
Stove	5.30	5.30@5.30	Rice	2.25	2.20@2.25
Nut	5.55	5.55@5.55	Barley	1.75	1.70@1.75

Quotations at the upper ports are generally 5 cents higher on account of the difference in water freight rates.

Bituminous—The fixing of the wage scale for the Central Pennsylvania District has had no effect on the New York market except to remove a feeling of uncertainty. Shippers feel freer to close contracts but there has been a let up in demand for spot coal and a consequent easing in prices. The Tidewater docks, in some instances, are again over-stocked and late last week a general embargo order was put on South Amboy shipments which was still in effect on Monday of this week.

Contract inquiries are heavier than last week and several are reported early this week as having been closed at the usual advance of from 25 to 30c. over last year's figures. Demand on New York shippers from New England is brisk and water transportation conditions have been favorable for quick deliveries.

There is an active call for high-grade coals at Tidewater but they are mostly out of the market, except for contract deliveries. The cheaper grades are plentiful. Production is scarcely better than half time owing to poor car supply and labor shortage, but even at this it is more than sufficient to meet all present demands.

Line quotations vary according to shipping directions, ranging from $1.25 to $1.75 covering most Pennsylvania coals. At Tidewater quotations for the cheaper grades range from $2.85 to $3.25.

Current quotations, per gross ton, f.o.b. tidewater for various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.60	$3.50@3.60	$3.50@3.60	$1.95@2.05
Georges Creek Tyson	3.35@3.50	3.35@3.50	3.35@3.50	1.80@1.95
Clearfield: Medium	3.10@3.20	3.10@3.20	.....	1.55@1.65
South Forks	3.25@3.50	.....	.....	1.70@1.95
Nanty Glo	3.10@3.20	.....	.....	1.55@1.65
Somerset County: Medium	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Quemahoning	.....	3.10@3.30	3.10@3.30	1.55@1.75
West Virginia Fairmont ¾	.....	2.75@2.85	2.75@2.85	1.00@1.10
Fairmont mine run	.....	2.75@2.85	2.75@2.85	1.00@1.10
Western Maryland	.....	3.00@3.10	3.00@3.10	1.45@1.55

PHILADELPHIA

Anthracite mines on half time working schedules. Little demand for coal. Some quiet price cutting. New agreement fails to affect slow bituminous trade. Prices firm.

Anthracite—The market is so badly unsettled by labor conditions that it is impossible to tell what a day will bring forth from the sales standpoint. The collieries are working irregularly and even the big companies are unable to predict from day to day how long they can avoid shutting down. The advance business is so small that they are depending on each day's orders to carry them along. As an example, one of the big companies after loading several hundred cars of prepared sizes one day was compelled to dump 150 cars into storage, much to their chagrin.

Sales agents are not trying to persuade the dealers to buy, leaving it entirely to their judgment. The agencies are not showing the usual ambition to sell coal and it is a most unsatisfactory situation, with each day bringing new rumors. In the retail market the conservative dealers are losing business because they are likewise refusing to insist on customers filling their bins, because of a possible drop in prices and the subsequent loss of their trade's goodwill. The yards which, with few exceptions, were filled to their capacities on Apr. 1, have had the stocks greatly reduced because the dealers sold more coal than they bought during the first half of the month. Now the rule seems to be to carry comfortable stocks but not to again go the limit.

In spite of strenuous denials the individuals persist in quietly cutting prices on prepared sizes from 10c. to 25c. per

ton. Even the favored buyers to whom the inducements are offered resent the policy, claiming it will only tend to further disrupt the market. The agencies generally are somewhat dubious as to whether there will be any spring reduction in prices. It is at least clear that if there should be a reduction it will be very small.

Now that the shippers have plenty of coal for this market and the dealers are not pressing them for shipments, collections have fallen way behind as compared with the first two months of the year, and are now causing the shippers some concern.

The car supply question has been practically lost sight of in the present dullness of the market, but it is reported that the collieries are closed every day for lack of cars. These statements are not at all fair to the railroads, as all idle time at the mines is due entirely to the lack of orders.

One of the large producing companies, who last fall stored large quantities of steam coal in every available yard they could secure are now moving this and several of the yards are already cleaned up. This would seem to indicate that the company does not anticipate any particular trouble in the region, although it is known that they are receiving a good price for the coal, quality considered, and it may be that with the conclusion of a new wage scale in the bituminous field, they find the present an opportune time to move the coal.

Prices per gross ton f.o.b. cars at mines for line shipments and f.o.b. Port Richmond are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.85	Pea	$2.55	$3.30
Egg	3.85	5.10	Buckwheat	1.55	2.30
Stove	4.10	5.10	Rice	.90	1.80
Chestnut	4.25	5.35	Barley	.55	1.30

Bituminous—The signing of the agreement in the central Pennsylvania district is the outstanding feature, but the news was accurately forecasted and caused no particular comment. Everyone seems to be well stocked with coal, and with the consumer actually expecting to buy at a lower price, there has been very little sold. There is no question that this market is glutted, and this week Perth Amboy, which had been opened for ten days for tide shipments, was again embargoed. Even under these adverse conditions, prices seem fairly stable which would seem to indicate that when the embargoed points are really opened it will result in a rising market. Fairmont lump and the mine-run grades have receded 15@20c. a ton, with mine-run going even lower than slack on account of less coal being screened because of the dearth of orders for three-quarter.

Prices per gross ton, f.o.b. cars at mines, rule about as follows:

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.50@1.60
South Fork Miller Vein	1.75@1.85	Fairmont gas, mine-run	1.35@1.45
Clearfield (ordinary)	1.50@1.60	Fairmont gas, slack	1.05@1.15
Somerset (ordinary)	1.40@1.50	Fairmont lump, ordinary	1.10@1.20
West Va. Freeport	1.25@1.35	Fairmont mine-run	.95@1.05
		Fairmont slack	1.00@1.05

BALTIMORE

Bituminous conditions flat, but movement better, due to easier car supply. Anthracite trade at standstill. Exports improve.

New business is almost at a standstill and consumers are slow to come in under contract. Even concessions as to price have failed to stimulate any spot business and many partial cancellations are noted on existing orders as industrial concerns seem to be well stocked for the time being.

Better grade steam coals are holding moderately firm and there is little inclination to cut contract quotations. Easy car supply along the Baltimore & Ohio and Western Maryland railroads increased the movement. Prices are about as follows: Georges Creek Tyson, $1.65; Miller Vein, $1.40; Quemahoning, $1.45@1.50; Somerset, $1.30; Freeport, $1.20; Fairmont gas, three-quarter, 85c.; same, mine-run, 80c., and slack, 80c.

Anthracite business is at a standstill. The continuance of the winter schedule over April has delayed early ordering by consumers for storage purposes.

The export trade continues to improve and an increasing number of charters is noted. Last week a total of 12,097 tons was loaded for foreign ports here.

HAMPTON ROADS

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending Mar. 18	Mar. 25	Apr. 1	Apr. 8	Apr. 15
Norfolk & Western	142,223	165,608	145,941	144,562	182,621
Chesapeake & Ohio	60 412	90,095	98,495	90,981	85,973
Virginian	104,810	103,055	65,026	74,198	83,228
Totals	307,445	359,758	309,462	309,741	351,822

Ocean Charters and Freights

OCEAN CHARTERS

Coal freight charters have been reported as follows:

BALTIMORE

Vessel	Destination	Tons	Rate
Rota	Buenos Aires	1,152	$20.00
Berlin	Banes (or Preston)	1,400	
Tenasserim	Buenos Aires	3,276	
Malpo	Valparaiso	3,186[4]	
Signe	River Plate	1,492	22.20
Jan Van Nassen[5]	Guayaquil	2,081	
Saba[5]	Guayaquil	2,687	24.60
Mar Caspie	Barcelona	1,632	

PHILADELPHIA

Petra	Antilla	1,292	
General Laurie	St. John, N. F.	198	

NEW YORK

Vessel	Destination	Tons	Rate
Brynhilda	Buenos Aires	1,409	$18.75

VIRGINIA

M. D. Cressey[2]	Para	1,884	15.00[1]
Vladimir Reitz	Rosario	1,349	26.16
Thalassa[3]	River Plate	1,335	20.00
Clara A. Donnell	Azores	990	14.00
Glenaffric	Buenos Aires		24.60
Horatio G. Foss[3]	Para	747	14.00[1]

[1] At or about. [2] April–May. [3] May. [4] Coke. [5] Previously noted under Atlantic Range.

OCEAN FREIGHTS

Transatlantic rates are firmer, the "Eretza Mendi" having been chartered from Virginia to Barcelona at $31.20, May loading, on which terms we have a number of other steamers offered, and which rate we thing can be shaded.

Plate rates are easier, among the recent fixtures being the following: "Jan Van Nassau" (Dutch), 4,200 tons, 10 per cent., Virginia to Lower Plate, $22.20, April. "Signe" (Swedish), 3,200 tons, 10 per cent., Virginia to Lower Plate, $22.20, prompt. "Erissos" (Greek), about 4,000 tons cargo, Virginia to Rosario, $22.80, April. "Maston" (British), about 5,400 tons cargo, Virginia to Port Militar, $22.80, May.

Freight rates to other destinations are unchanged. We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.75@5.00	Bermuda	$5.00@6.00
Cardenas or Sagua	6.25 about	Vera Cruz	7.00@8.00
Cienfuegos	5.50 about	Tampico	7.00@8.00
Port au Spain, Trinidad	7.25@7.50	Rio Janeiro	[4]19.00 about
St. Lucia	7.25@7.50	Santos*	[4]19.00 about
St. Thomas	6.75@7.00	Montevideo	[1]21.60@22.20
Barbados	7.25@7.50	BuenosAires or La Plata	[1]21.60@22.20
Kingston	6.25 about	Rosario	[2]22.80 about
Curacao	6.75@7.00[3]	West Coast of Italy	33.60@36.00
Santiago	6.00@6.25[6]	Barcelona[5]	30.00@31.20
Guantanamo	6.00@6.25[6]	Valparaiso or Callao	17.00 about
Demerara		Marseilles	32.40@34.80

* Consignees paying dockage dues. ** Spanish dues for account of cargo.

[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port. [6] 350 tons discharge.

W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

There is no slackening in the demand for transportation along the coast; $2@2.25 is still the range of rates from Hampton Roads to Providence and $2.25@2.50 to Boston. There is still very little space open to charter and the situation in that respect threatens to be serious for consumers in New England who rely on barges and steamers in the open market.

Barge freights from New York to Long Island Sound points have eased somewhat, charters having been made this week at 90c.

VESSEL CLEARANCES

The following steamers have cleared from various ports during the past week:

PHILADELPHIA

Vessel	Destination	Tons
Pensiero	Savona	
Daylight	Rio de Janeiro	
Hermod	Fort de France	
Sark	Havana	
Petra	Antilla	1,292
Florence Creadick	Cardenas	657

NEWPORT NEWS

Tordenskjold[7]	St. Lucia

BALTIMORE

Vessel	Destination	Tons
Gradfaxe	Guatemala	1,594
Berlin	Cuba	2,847
Rota	Uruguay	3,382
Robert P. Murphy	Brazil	994
Mar Caspio	Spain	3,280

NORFOLK

Hawaiian[6]	Rio Janeiro	2,498
Dorothy[13]	Buenos Aires	

[1] Atwater & Co. [2] Baker Whiteley [3] Barber & Co. [4] Berwind-White [5] C. G. Blake Co. [6] Castner, Curran & Bullitt [7] Chesapeake & Ohio C. & C. Co. [8] Crozer-Pocahontas Co. [9] Hasler Brothers [10] Flat Top Fuel Co. [11] New River Coal Co. [12] Pocahontas Fuel Co. [13] Smokeless Fuel Co. [14] C. H. Sprague & Son [15] White Oak Coal Co.

SHIPPING NOTES

Warned Against German Coal—Neutral shipowners have been warned by the British Foreign Office that all cargoes or bunkers of coal of German origin in neutral ships would be liable to seizure under the order in council of Mar. 11. The Foreign Office advised neutrals to obtain certificates from British consular officers showing that the coal in their ships did not originate in Germany.

LAKE MARKETS

PITTSBURGH

Local points in mining rates being adjusted. Pittsburgh operators regard signing of McAlpin agreement as being in regular form. Market slightly stiffer, except on slack. Shipments to the Lakes begun.

It may be a fortnight or longer before all the mines in the district are down to a regular working basis after the general wage scale settlement. Local coal operators do not seem to be anxious to make it clear just how binding the McAlpin settlement is upon the western Pennsylvania operators. They point out that Messrs. Schleuderberg and Donaldson, who signed, were regularly elected delegates of the local association, and that the refusal of one of the delegates to sign still left a majority of the delegation.

It is suggested that at many mines there are local points to be settled and of course the individual operators can negotiate better with their men as to such matters if their adherence to the general settlement is not too explicitly expressed. The prediction is made in well-posted quarters that the minor differences will be adjusted and that in both thick-vein and thin-vein mines the general rates adopted at the conference will be established. The local association held a meeting in Pittsburgh Monday afternoon of this week, but no definite statement as to what was done is given out.

The general tone of the coal market is improved. Consumers have shown more willingness to place contracts and the operators are somewhat stiffer in their views. Free coal is still more or less of a drug on the market and thus far prices are only slightly stiffer. A few operators made their initial shipments for the Lake trade last week but even this week the volume of coal actually moving in this trade is small. The boats are to make the earliest start possible and several ice breakers started work this week in the channels. Predictions are that the season's total will make a new record. Slack has not stiffened a particle in price and as the Lake movement increases is likely to become easier.

Through an obvious typographical error in last week's report the minimum on mine-run was given at $1.05, or 5c. under the minimum on slack, instead of $1.15. We quote free coal as follows, slack being 5c. lower and mine-run and screened 5c. higher than a week ago: Slack, $1.05@1.15; mine-run, $1.20@1.30; ¾-in., $1.30@1.40; 1¼-in., $1.40@1.50, per net ton at mine, Pittsburgh district.

BUFFALO

Demand light. Miners not working steadily. Cars more plentiful but still occasionally difficult to get.

Bituminous—The uncertainty of everything in the coal business continues the dominating factor, embargoes and shortage of cars still interfering. The roads move all freight very irregularly and the result is that while some cars are long in getting to destination others are rushed in, to the embarrassment of the consignee, who was prepared for delay.

The trade is not agreed as to the firmness of prices. Some shippers, especially if they deal chiefly in Pittsburgh coal, call the market firm, as that district is holding up prices rather more firmly than the average, but there is cheap southwestern coal coming in that make local prices rather unsteady. There are strikes in the West Penn district and the miners in the Allegheny work spasmodically, threatening to go out entirely if the wage scale is not fixed soon.

The consumption is good. There is no report of falling off anywhere and while the near approach of the opening of the Lake trade has weakened the price of slack that will only be temporary; as soon as the Lake fleet is in full operation and the plan of handling slack is adopted the market should settle down. The following is the scale of prices:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—The trade is about as light as it ever is at this time of the year. Consumers have been obliged to buy some extra supplies on account of cool weather, but no buying for future use has been done and none will be till there is a definite price fixed.

Locally, activity is confined to loading Lake vessels. If the port was not short one water trestle there would be a heavy movement and as it is there is about 200,000 already loaded, which is fair for a beginning. The Lake fleet is beginning to move and an outlet for surplus coal will thus be afforded.

The following is the continued winter price at wholesale for anthracite, per gross ton, f.o.b. cars, Buffalo:

Grate	$5.60	Chestnut	$6.10
Egg	5.85	Pea	4.30
Stove	5.85	Buckwheat	3.25

An additional charge of 25c. a gross ton is made for putting coal on vessels.

TORONTO, CAN.

Anthracite quiet. Bituminous in fair demand. Stocks well kept up and prices steady. Supplies coming in better though deliveries are rather slow.

Business is less active with the advance of the season especially in anthracite. Bituminous for manufacturing purposes is in steady demand. Dealers are keeping up stocks and supplies are coming forward freely though deliveries are still a little slow. Owing to the lessened demand the shortage of labor is not seriously felt. Prices are steady, quotations for best grades per short ton being as follows: Retail anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.50; domestic lump, $6. Wholesale f.o.b. cars at destination, bituminous three-quarter lump, $3.75; screenings, $3.50; Pennsylvania smokeless lump, $4.50; Pocahontas lump, $5.50; slack, $3.75.

TOLEDO

Demurrage rates are on and boats are being loaded ready to start when navigation opens. Heavy shipments anticipated.

Boats are loading at the various docks although none have yet started up the lakes, owing to the reports of heavy ice at the upper ports. The new demurrage ruling of the railroads went into effect Apr. 11 and shippers are making every effort to avoid demurrage. Boats are hard to get and shippers are finding some difficulty in securing bottoms to unload cars into. The new demurrage rates have been placed far in advance of the usual custom and may have an effect on the early shipping. It is believed that boats will be more plentiful later on and that the Lake business will be exceptionally heavy this season. Prices are holding fairly firm on all grades.

COLUMBUS

Some activity in steam coal contracting. Wage-scale conference being closely watched.

The best feature of the coal trade in Ohio is the demand for steam tonnage. Despite the fact that working conditions in none of the Ohio mining districts have been adjusted, there are quite a few large steam contracts being closed. One railroad fuel contract of large proportions was closed during the past week at $1.30 for three-quarter inch, eastern Ohio coal. That is fully 20c. higher than the contract figures of last year. Some of the operators and jobbers are waiting until working conditions are settled before closing contracts.

Domestic business is at a standstill as the active season is over and stocking has not yet started. Retail prices are generally well maintained. There are some orders being placed for shipment of domestic grades in May and June and some operators are devoting considerable attention to future orders. Pocahontas remains strong in every particular and contract prices are well maintained. West Virginia splints are also improving.

Lake trade is about to start although the formal opening of navigation will be later than usual. Considerable tonnage has been loaded already. Chartering of boats is attended with difficulties as the ore and grain trades are taking a large number of boats.

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.50	$1.60	.....	Mine-run	$1.15	$1.20	$1.15
Inch and a quarter	1.40	1.40	$1.40	Nut, pea and slack	.90	.90	.85
Three-quarter-inch	1.35	1.35	1.30	Coarse slack	.80	.80	.75
Nut	1.25	1.25	.....				

CINCINNATI

The market is inactive, but steady. Shortage of labor and cars is a strong factor.

In spite of the fact that there is relatively little demand for coal just now, the trade is definitely optimistic. The prospects are good for a big spring business and prices are not only steady, but are showing signs of advancing all along the line. The scarcity of cars and a growing shortage of labor, especially in the West Virginia fields, are strong constructive factors in the market. It is fairly certain that there will be no labor trouble but there is going to be difficulty in getting enough men.

The steam market is very strong, particularly as contrasted with the sluggish condition of the domestic trade, which is marking time pending the opening of Lake shipping. When that takes place there will be more plentiful supplies of screenings which will give the steam side of the market an easier tone.

DETROIT

Lake movement starts. Market generally quiet. Considerable consignment coal but prices are steady.

Bituminous—Steam users show a tendency to hold off on giving orders though inquiries continue numerous. The business falls considerably short of what shippers and wholesalers believe should be developing at this season of the year, with industrial and manufacturing establishments generally operating near capacity. The greater part of the buying seems to center on fine coal and three-quarter lump.

Domestic consumers seem satisfied they will have no further use for fuel for the present and retail dealers manifest no disposition to add much to their stocks. Consignment coal is very plentiful. Price reductions are occasionally made to effect sales but there seems to have been no weakening of general prices.

Anthracite—Very little demand appears for anthracite, although there is some interest in chestnut and stove sizes. Shippers are doing little business and are handicapped by the uncertainty as to what prices may be later in the year. Orders now taken are on the March basis.

Lake Trade—Movement of coal by the Lake route was inaugurated during the week, when the steamers "Alpena" and "Wyandotte" delivered coal cargoes at Alpena, Mich. Ice conditions still prevent through navigation to Lake Superior and Lake Michigan ports. Ice-breaking steamers are at work opening a channel through St. Marys River and into several ports. Coal shippers are still endeavoring to close charters for vessel capacity for opening trips, but are meeting with little success.

MIDDLE WESTERN

GENERAL REVIEW

Little activity in current buying. Spot demand for all sizes light. Contracting brisk. Screenings touch a higher level.

There is no spot business in the Western coal market; production is flat and shippers are awaiting developments. Most mines are closed down, only a few working to fill orders for steam sizes. Operators are generally taking advantage of the period of idleness to make needed repairs. At a number of Indiana and Illinois mines new screening equipment is being installed. A great many miners are leaving the coal fields to enter steel mills and factories and a shortage of labor is anticipated when operations are resumed. This may cause the large steam users and retailers to place orders earlier this year in order to help the mine owners keep their men together.

Steam buyers seem to have dropped out of the market since the announcement of an advance of 10c. per ton on these coals. Some domestic buyers are of the belief that contract prices will be lower than open market prices, and show more of a disposition to close. The few contracts made for Western steam coals have been covered at an advance, and inasmuch as several railroads will shortly be in the market for their fuel supplies it is felt that contracting will soon be on in full swing.

Current buying seems to be mainly centered in screenings, which are quoted as high as $1.10 from the southern Illinois field. The Lake movement is receiving considerable attention; dock companies are quoting about 25c. a ton higher than last year, and as soon as navigation commences they will undoubtedly absorb a much larger tonnage than ever before. Northwestern rail demand from Illinois mines is lifeless, and but few contracts have been placed in that territory, although there are numerous test shipments being made. It is expected that the demand for farming coal from Western dealers will be reduced this season because of the greatly increased use of gasoline and kerosene for plowing and threshing.

CHICAGO

Screenings very active and demand for other steam sizes well sustained. Smokeless market soft. Anthracite very dull. Contracting in the Chicago district slow.

In Franklin and Williamson County only a few mines are in operation. Screenings are very stiff, while the demand for other steam coals, especially the small sizes, is good. Very little railroad tonnage is moving from this field. The recent cold snap cleaned up some of the unbilled domestic coal on track. Some contracting has occurred for Saline County production at the advanced prices. Spot prices are firmly held.

A small railroad tonnage has been moving from the Springfield district, but there has been but little demand from other sources except in screenings, which are urgently wanted at prices ranging from 90c. to 95c.

In the Indiana field the Clinton mines have been idle. In Knox County a few mines have been operating spasmodically, mostly to provide coarse steam sizes and screenings. The Sullivan and Greene County mines are generally closed and little tonnage was moved this week in any direction. A new schedule of prices goes into effect immediately on the Indiana grades about as follows: $1.60 to $1.70 for 4-in. lump; $1.50 to $1.60 for 2½-in. lump, and $1.35 to $1.50 for 1¼-in. lump. All prices will range from 10c. to 15c. per ton higher for the coming year. A number of mines expect to resume work next week on account of accumulated orders from steam users.

The smokeless lump and egg trade is demoralized with prices sagging below the level of $1.30. Current arrivals consist mostly of mine-run to apply against contracts, and little spot coal is coming in. The excessive accumulations of smokeless mine-run last week was moved at very low prices, and left the spot market in a demoralized state.

The demand for Miller's Creek block is fair, but other Kentucky domestic sizes are being sacrificed at new low levels. Spot sales of lump have been made as low as $1.20. The all-rail splint trade is very quiet, but the Lake demand is active.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.35@1.45	$1.45@1.50	$1.50@1.60	$1.50@1.60	$1.50@1.60
Steam lump	....	1.25@1.35	....	1.35@1.50	1.35
2½ and 3-in. lump	....	....	1.40@1.50	1.50@1.60	....
1½-in. lump	....	....	1.25@1.35	1.40@1.50	1.35
Egg	1.35@1.45	1.25	1.30@1.35	1.35@1.45	1.40@1.50
Nut	....	1.25	1.20@1.25	1.35	1.35
No. 1 washed	1.45@1.50	....	1.85	....	....
No. 2 washed	1.35@1.40	....	1.65	....	....
No. 1 nut	1.45	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.25	1.15@1.25	1.10@1.15	1.25@1.30	1.15@1.25
Screenings	1.00@1.10	.90@ .95	.85@ .95	1.00@1.05	.90@1.00

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.35@1.45	$1.40@1.90	$1.40@1.60	$1.25@1.60	$1.50
1½-in. lump	1.25@1.30	....	....	....	....
Egg	1.35	1.25@1.50	1.40@1.60	1.25@1.60	1.00
Nut	....	1.15@1.35	1.35	1.25@1.45	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.25	1.15@1.25	1.25@1.35	1.25@1.35	1.10@1.20
Screenings	.95@1.00	.90	....	....	....

COKE

CONNELLSVILLE

Decreased requirements and heavy production make too much coke and spot prices decline while contract negotiations practically cease.

Spot furnace coke has been very easy the past week, there being increased offerings and very little absorbing power. There have been additional requests for suspension of shipments on regular contracts, but some of the suspensions previously reported have now run out. Five or six blast furnaces tributary to the Connellsville region have gone out for relining of late and altogether there is hardly as great consumptive demand while with continued fair car supplies, the production is larger. Nothing appears to have come thus far of the talk of curtailing production. The operators are afraid of reducing the working time because they may lose men and as labor is scarce and likely to be still scarcer this is an important consideration.

Thus, from one viewpoint, there is now a surplus of coke for the simple reason that a shortage of labor is feared which would make an insufficient supply. With the fall in spot furnace coke prices, consumers not covered for the second half of the year are less disposed to negotiate contracts and the whole market is rather a dull and listless one. We quote: Spot furnace, $2.25@2.50; contract, $2.50@3; spot foundry, $3.75; contract, $3.50@4, per net ton at ovens. The $4 price on contract foundry coke is merely an asking one, some operators expecting to secure it later and meanwhile practically staying out of the market.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 8 at 465,664 tons, a decrease of 11,331 tons, and shipments at 465,475 tons, a decrease of 11,449 tons.

Buffalo, N. Y.—The price is still weak and the demand light, but owners of ovens in the Connellsville district say they look for a firming up of price as soon as the spring repairs to the furnaces are complete. The natural consumption of all coke, based on the size of the iron trade, is as large as ever. Quotations are on the basis of $5.50 for best 72-hr. Connellsville foundry, and $4.25 for 48-hr. furnace.

Chicago—Contracting in byproduct coke sizes has been very active. Retailers are placing contracts for domestic

coke for the ensuing year. Spot buying shows some recession, but prices are firmly held at previous quotations which are as follows, per net ton, f.o.b. cars Chicago: Connellsville, $6.50; Wise County, $6.25 to $6.50; Byproduct Foundry, $6.25 to $6.50; Byproduct domestic, $4.50; Gas House, $4.50 to $4.60.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for March and the first three months of 1915-16 were as follows:

	March		3 Months	
	1916	1915	1916	1915
Phila. & Reading	1,237,378	961,415	3,418,425	2,415,915
Lehigh Valley	1,001,614	894,031	3,017,342	2,735,370
Cent. R.R. of N. J.	582,465	578,322	1,804,019	1,660,546
Del. Lack. & West.	1,063,665	644,932	2,763,367	1,850,716
Del. & Hudson	490,453	617,605	1,726,737	1,785,877
Pennsylvania	581,845	544,023	1,727,085	1,367,597
Erie	741,714	593,250	2,108,408	1,706,140
Ont. & Western	152,958	151,820	513,874	472,879
Lehigh & New Eng.	275,259	89,895	628,750	263,767
	6,127,351	5,075,293	17,708,007	14,258,807

NORFOLK AND WESTERN

Destination of shipments over this road for February and the first two months of last year and this year were as follows, in short tons:

	February		Two Months	
Coal	1915	1916	1915	1916
Tidewater, foreign	92,375	239,320	196,625	425,815
Tidewater, coastwise	265,018	297,508	525,569	651,468
Domestic	1,263,628	2,052,505	2,785,765	4,209,839
Coke				
Tidewater, foreign	1,096	6,198	1,510	9,826
Domestic	67,489	167,857	137,290	320,577
Total	1,689,606	2,763,388	3,646,759	5,608,525

IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for January, 1914-15, and for the 7 months ending January, 1914-15-16, in long tons:

	January		Seven Months		
Imports	1915	1916	1914	1915	1916
Anthracite, total	1	4,370	997	12,115	7,124
Bituminous, total	134,075	156,566	801,541[1]	840,627	954,747
United Kingdom	1,923	1,728	4,913	21,112	5,359
Canada	99,808	148,069	579,071	639,686	819,966
Japan	5,946	4,550	74,306	58,287	54,570
Australia	25,597	2,219	141,284	120,219	74,041
Other countries	801	.....	1,967	1,323	811
Coke	5,118	6,289	66,025[1]	73,191	33,077
Exports					
Anthracite total	190,299	274,986	2,283,862	2,147,876	2,090,791
Canada	188,781	257,608	2,242,101	2,109,323	1,997,000
Argentina	.....	.....	.....	.....	1,931
Brazil	.....	100	.....	6	2,472
Uruguay	.....	.....	84	.....	600
Other countries	1,518	17,278	41,677	38,547	88,788
Bituminous total[1]	633,145	942,144	10,878,629	8,684,898	11,345,759
Italy	88,622	100,039	.....	577,860	1,892,579
Canada	354,210	536,264	8,516,274	6,005,140	6,116,441
Panama	28,069	36,026	241,054	144,219	324,145
Mexico	44,128	23,099	182,973	252,138	118,511
Cuba	59,197	80,860	685,759	595,328	717,656
West Indies	13,797	46,109	337,271	253,390	348,661
Argentina	7,259	33,142	52,801	151,419	400,380
Brazil	19,375	31,401	170,521	201,483	334,548
Uruguay	.....	8,159	16,858	30,494	93,215
Other countries	18,488	47,045	675,118	473,427	1,099,623
Total coal	823,444	1,217,130	13,162,491	10,832,774	13,436,550
Coke	57,447	90,890	458,403	299,141	529,673
Bunker coal	528,418	570,461	4,575,059	3,949,914	4,393,934

[1] Part year only.

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during March and the preceding three months in short tons:

	December	January	February	March
Pocahontas Field	1,387,033	1,487,189	1,434,153	1,506,671
Tug River District	328,558	343,516	333,102	338,232
Thacker District	258,980	284,135	254,953	276,308
Kenova District	86,724	89,459	83,218	88,440
Clinch Valley District	123,528	131,242	124,626	137,641
Other N. & W. Territory	7,127	4,547	3,616	5,724
Total N. & W. Fields	2,191,950	2,340,088	2,233,668	2,353,016
Williamson & Pond Creek	87,365	96,436	100,985	104,846
Tug River & Ky. R.R.	51,919	58,045	50,925	54,254
All other railroads	139,593	158,840	168,798	205,391
Grand total	2,470,827	2,653,409	2,554,376	2,717,507

I. C. C. DECISIONS

I. C. C. No. 7640—West Lumber Co. vs. St. Louis & San Francisco R.R. Co. (Submitted Oct. 4, 1915. Decided Mar. 1, 1916.)

Rates charged by defendants for the transportation of coal in carloads from Bonanza, Huntington, Hackett and Hoffman, Ark., to Onalaska, Tex., found to have been unreasonable and unjustly discriminatory. Reparation awarded.

I. C. C. No. 7521—Meeker & Co. vs. Central Railroad Company of New Jersey. (Submitted Apr. 21, 1915. Decided Mar. 4, 1916.)

The complaint alleges that the rates applicable on anthracite coal in carloads from Mocanaqua, Penn., and other points in the Wyoming coal region of Pennsylvania to Elizabethport, N. J., f.o.b. vessels for reshipment, are unreasonable; Held:

1. That reasonable maximum rates for the future have been prescribed in Rates for Transportation of Anthracite Coal, 35 I. C. C., 220.

2. That the question of reparation be held in abeyance for determination in a supplemental proceeding.

I. C. C. No. 7933—Consolidated Fuel Co. vs. Atchison, Topeka & Santa Fé Ry. Co. Submitted Aug. 24, 1915. Decided Mar. 20, 1916.

Defendants' rates for the transportation of soft coal in carloads from Mohrland and Hiawatha, Utah, to California points on the Atchison, Topeka & Santa Fé's branch line from Los Angeles, Calf., to National City, Calif., found to be unreasonable; a maximum joint through rate of $6.65 per net ton prescribed.

I. C. C. No. 7882—Henry Holverscheld & Co. vs. Lehigh Valley R.R. Co. Submitted Oct. 18, 1915. Decided Mar. 16, 1916.

Charges collected for the transportation of a carload of coal from Coxton, Penn., to Lizton, Ind., reconsigned to Chicago, Ill., not shown to have been unreasonable or unjustly discriminatory. Complaint dismissed.

I. C. C.—No. 7853. Oklahoma Fuel Co. vs. Fort Smith, Poteau & Western Railway Co. submitted Sept. 16, 1915. Decided Mar. 20, 1916.

Charges collected for the transportation of one carload of coal from Witteville, Okla., to Gould, Okla., reconsigned to Wellington, Tex., and returned to Gould, not found to have been unreasonable. Complaint dismissed.

I. C. C. No. 8018—Oklahoma Fuel Co. vs. Missouri, Kansas & Texas Railway Co. of Texas. Portion of Fourth Section Application No. 461. Submitted Sept. 16, 1915. Decided Mar. 20, 1916.

Rate charged for the transportation of one carload of coal from Witteville, Okla., to Burkburnett, Tex., and the rate legally applicable found to have been unreasonable. Reparation awarded. Defendants' application for relief from the provisions of the fourth section denied.

I. C. C. No. 8172—Sunderland Brothers Co. vs. Chicago & North Western Railway Co. Submitted Dec. 7, 1915. Decided Mar. 20, 1916.

Through rate charged by defendants for the transportation of a carload of lump soft coal from Hudson, Wyo., to Steinauer, Neb., found unreasonable to the extent that the rate charged for the haul from Omaha, Neb., to Steinauer exceeded the rate subsequently established and now in effect.

FOREIGN MARKETS

GREAT BRITAIN

Mar. 29—Prices continue very strong and great difficulty is being experienced in getting supplies for early loading. Colliery owners are heavily committed for some time ahead. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$8.40@8.64
Best seconds	Nominal	Seconds	8.28@8.52
Seconds	$8.40@9.00	Best Cardiff smalls	4.56@4.80
Best dry coals	8.64@8.88	Cargo smalls	2.88@3.84

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Rates for prompt boats show some irregularity, due to difficulty in securing stems, and are approximately as follows:

Gibraltar	$14.40	Naples	$21.60	St. Vincent	$11.40
Marseilles	22.29	Alexandria	24.60	River Plate	15 60
Algiers	21.23	Port Said	24.00		
Genoa	21.60	Las Palmas	10.80		